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Vol. XXV
No. 5

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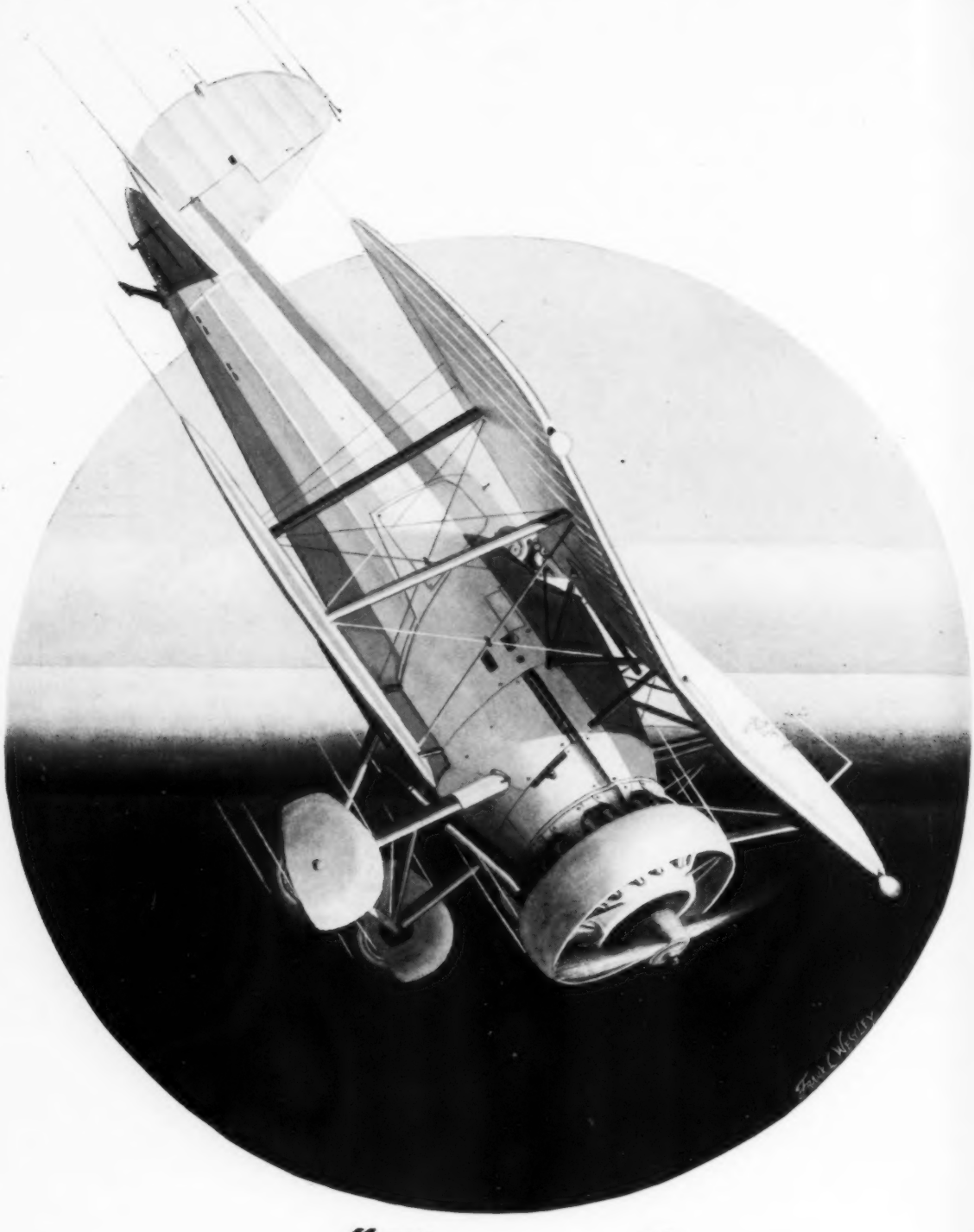

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The AIRCRAFT ENGINEER AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1933.
Feb. 2. "Operation of Aircraft Over Tropical Routes," Lecture by A. Plesman before R.Ae.S.
Feb. 3. Cinque Ports Flying Club Annual Dinner and Dance Royal Pavilion Hotel, Folkestone.
Feb. 8. "Recent Operations in Kurdistan," Lecture by Group-Capt. A. G. R. Garrod before R.U.S.I.
Feb. 8. Herts and Essex Ae.C. Annual Dinner and Dance, Wharncliffe Rooms, Hotel Gt. Central, London.
Feb. 9. Hockey: R.A.F. v. Lincolnshire at Henlow.
Feb. 10. Old Haileyburian R.F.C. Annual Dance, Savoy Hotel.
Feb. 10. Viceroy's Challenge Trophy Race, Delhi.
Feb. 13. "A Review of Air Transport," Lecture by G. E. Woods Humphery before Inst. of Transport.
Feb. 16. "Cloud Formation," Lecture by Sir Gilbert Walker before R.Ae.S.
Feb. 18. Services Rugby: R.A.F. v. R.N., Twickenham 3 p.m.
Mar. 3. No. 25 (F.) Sqd., R.A.F., Re-union Dinner at May Fair Hotel. (Postponed from Jan. 6.)
Mar. 4. Services Rugby: R.N. v. The Army, Twickenham 3 p.m.
Mar. 9. "Engine Cooling Research." Lecture by R. McKinnon Wood before R.Ae.S.
Mar. 23. "Seaplane Research," Lecture by H. M. Garner before R.Ae.S.
Mar. 24. Bristol and Wessex Ae.C. Dance at Grand Spa Hotel.
Mar. 25. Services Rugby: R.A.F. v. The Army, Twickenham 3 p.m.
Mar. 29. "The East African Dependencies." Lecture by H. F. Melland before R.U.S.I. Chairman, Air Vice-Marshal Sir V. Vyvyan.
May 10. Kent Air Pageant and Opening of Maidstone Aerodrome.
May 16-22. International Rally, Vienna.
May 25. Tourist Rally at Wiesbaden.
May 27. Reading Ae. C. Annual "At Home."
June 24. Royal Air Force Display, Hendon.

INDEX FOR VOL. XXIV.

The 8-page Index for Vol. XXIV of "Flight" and "The Aircraft Engineer," January to December, 1932 (with over 6,463 references for "Flight" and 195 references for "The Aircraft Engineer"—6,658 in all), is now ready and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C.2, price 1s. per copy, net (1s. 1d. post free).

EDITORIAL COMMENT

GENEVA, we presume, is trying to play up to Mr. Roosevelt in the matter of disarmament, hoping, no doubt, that this may be taken as some sort of *quid* for the *quo* of debt revision. Great Britain, possibly because she is the chief debtor of the United States, is trying to hurry Geneva on by proposing a new programme of work. The lines of the proposal are those with which we are all familiar, but it is to be noted that in it air forces are treated differently from naval and land forces.

Control of Civil Flying

It is suggested that the Disarmament Conference should form a Committee within itself to consider the possible abolition of all naval and military aircraft and of bombing from the air, as well as the international control of civil aircraft. This Committee is, from our point of view, the important part of the British proposal.

FLIGHT has already repeatedly expressed its opinion on the folly of trying to disarm Western Europe while Soviet Russia is busily arming with all the energy and ability which she can muster. We are glad to believe that the energy is greater than the ability. We have also expressed our opinion on the futility of asking any belligerent to refrain from the use of aircraft in war. One might just as well try to forbid binoculars. We have likewise noted Mr. Baldwin's admission of the obvious, that so long as there are civil aircraft there must be potential

military aircraft—albeit not, in our opinion, very efficient ones. The whole question of air disarmament depends, in theory at any rate, on making all civil aircraft as unsuitable as possible for use in war. Admittedly they cannot be so restrained except by some form of international control. Great Britain, accordingly, has proposed that the Committee of the Conference should examine this possibility.

We hope that Mr. Roosevelt will be duly impressed by this British suggestion, especially as the United States are hardly in any danger from Soviet Russia. For our part, we find the suggested international control of civil flying so preposterous an idea that it scarcely deserves the powder and shot of destructive criticism. We take comfort in the thought that, while the Disarmament Conference itself may be in the hands of idealist visionaries or astute politicians with their eyes glued to the debt problem, the suggested Committee must be very largely dominated by those who are called experts. At the least, the Committee, if it ever comes into being, will have to listen to men who have a practical knowledge of civil aircraft and civil flying, and they will be able to explain how utterly impossible would be any form of international control.

The great need of civil flying, or at least of private flying, is not more control but less control. So far from being willing to submit to the scorpions of international control, we in Great Britain find the whips of our own Department of Civil Aviation grievous to be borne. For dealing with a great concern such as Imperial Airways, which is subsidised by the Government, the present system may be well enough. Private flying is different—we are not quoting from the debate held by the Royal Aeronautical Society—and requires much more freedom if it is to expand normally and healthily. At present there is, in fact, a form of international control, for a private owner who wishes to make a flying tour of Europe must be able to produce a certificate of airworthiness from his (or her) own country. This is an irksome requirement, and efforts should be made to get it modified. Even more emphatically we must reiterate our objection to all the restrictions imposed by our own Department of Civil Aviation on the development of cheap flying for the private owner. At one time it may have been well enough. Now we are of the opinion that matters could be left to the constructors and the insurance companies.

This is not to suggest that there should be no control of any sort. Certain factors of safety could be laid down by the Air Ministry, and there could be occasional surprise visits of A.I.D. inspectors to the factories. The insurance companies or Lloyd's would also be interested in seeing that the type conformed to the stipulated factors of safety. The type would be classified at Lloyd's as ships are now classified. Such precautions would protect the unwise buyer from gross cases of structural failure in the air in normal flying. The high premium which would be charged for insurance of certain types would also be a warning to the buyer, though it is scarcely possible to insist that every aircraft should be insured. Third-party risks, however, should be made compulsory, as they are in the case of cars. It is true that at present the dangers of collision in the air are not very great, and likewise the odds are that a machine which spins into the ground will not hit any person or even damage a building. None the less, an aeroplane crash does usually bring about a considerable amount of damage. Crowds dash to the spot and damage hedges and crops, etc., for all of which the owner of the aircraft (or his heir) is liable. Knowing this, the insurance companies would not fail to ask high premia for third-party risks in the case of types of aircraft which were considered dangerous to fly. The compulsory premium would add to the price of the machine, and so the too-optimistic buyer who was inclined to be attracted by a low initial price would be induced to think again.

Some think that there is no real need to protect the buyer. It is argued that the firms which design and construct aircraft will always think of their own reputation and their business future, and will invariably take all the precautions which authority could oblige them to take. Unfortunately, all people are not equally long-sighted and scrupulous in such matters, and a certain degree of control may be advisable.

It is also sometimes said that no trouble should be wasted in protecting the unwise buyer from the results of his own folly. This seems rather harsh. There are quite a number of people who are quite admirable in most respect, but are too optimistic when embarking on a new enterprise. They might be willing to buy a cheap aeroplane which was well advertised, and trust to luck. It would be foolish, but such folly is not criminal, and hardly deserves capital punishment. They do, as a matter of fact, deserve a degree of protection against their own folly. Sufficient protection would be provided, we believe, by the scheme already outlined. Moreover, we are not suggesting the absolute abolition of the certificate of airworthiness for light aeroplanes. It should be possible to obtain one, though we do not think that it ought to be obligatory as it is at present.

The meticulous amount of control which has gradually been built up by the Air Ministry is the subject of our complaint. The time has come for a substantial easing off of the regulations which add to the cost of light aircraft and hamper the advance of flying.

With easier rules, on the lines suggested above, aircraft ought to become cheaper and then the amount of flying in the country would rapidly increase. New firms, of which a number have come into existence in the last few years, might perhaps find it a slower business to get their products on the market without the backing of a certificate of airworthiness, but with the increase of flying which would be induced by cheaper aircraft, capital would become more easily available for aircraft firms, and then the delay in winning popularity would be of less account.

Prince of Wales' Visit to Scilly Isles

THE Prince of Wales has been compelled to cancel his visit to the Scilly Isles. As was reported in FLIGHT last week, His Royal Highness intended to fly to his destination.

Proposed England-Australia Flight

AIR COMMODORE SIR CHARLES KINGSFORD-SMITH is to leave Australia for England within the next few weeks. It is reported that he intends to attack the England-Australia record, which he has twice held in the past.

GETTING READY FOR MOUNT EVEREST : The Westland modified "P.V.3." (FLIGHT *Photo.*)

The "Houston-Westland"

Originally designed and produced by the Westland Aircraft Works as a private venture, and known as the "P.V.3," this machine has been modified to make it suitable for the Everest flight. Of the more important modifications may be mentioned the substitution of a Bristol "Pegasus" S.3 for the Bristol "Jupiter" X.FA engine originally fitted.

THE Westland "P.V.3" was designed to meet the requirements of Army co-operation and Fleet Air Arm work, and is of the class known as a General Purpose aircraft. This necessarily meant that the machine was designed for carrying heavy loads. Consequently the wing area is comparatively large (500 sq. ft.) to avoid too great wing loading, and this in turn renders the machine suitable, when fitted with a fully supercharged engine, for work at considerable height. For the forthcoming Houston-Mount Everest flight a high ceiling was a first consideration, and when it came to selecting an available aircraft type the choice fell on the Westland "P.V.3." In its military form the machine was fitted with the Bristol "Jupiter" X.FA engine, but for the flight over Mount Everest, which is scheduled to take place some time in March, one of the new Bristol "Pegasus" engines, type S.3, has been fitted. This engine is fully supercharged, has a propeller reduction gear ratio of 0.5 to 1, and at its rated altitude of 11,000 ft. develops a normal power of 525 b.h.p. at 2,000 r.p.m., and a maximum power of 570 b.h.p. at 2,300 r.p.m. For taking off at sea level the maximum power permissible for 3 min. at normal r.p.m. is 500 b.h.p.

Fundamentally the Westland "P.V.3" is an all-metal two-bay tractor biplane, of orthodox design in the matter of general lay-out, but characterised by wings of high aspect

THE CREW READY FOR A TEST FLIGHT : The Marquis of Clydesdale will pilot the machine, and Lt. Col. Blacker will act as observer and photographer. (FLIGHT *Photo.*)

THOSE RESPONSIBLE FOR THE FLYING EQUIPMENT: Left to right, Mr. A. Davenport, Chief Designer; Mr. H. J. Penrose, Test Pilot, and Mr. R. A. Bruce, Managing Director of Westlands. (FLIGHT *Photo.*)

ratio to obtain the lowest possible induced drag during climb.

The undercarriage is of very wide track (12 ft. 10 in.), as the machine was originally designed with a view to being capable of carrying a 1,000 lb. torpedo.

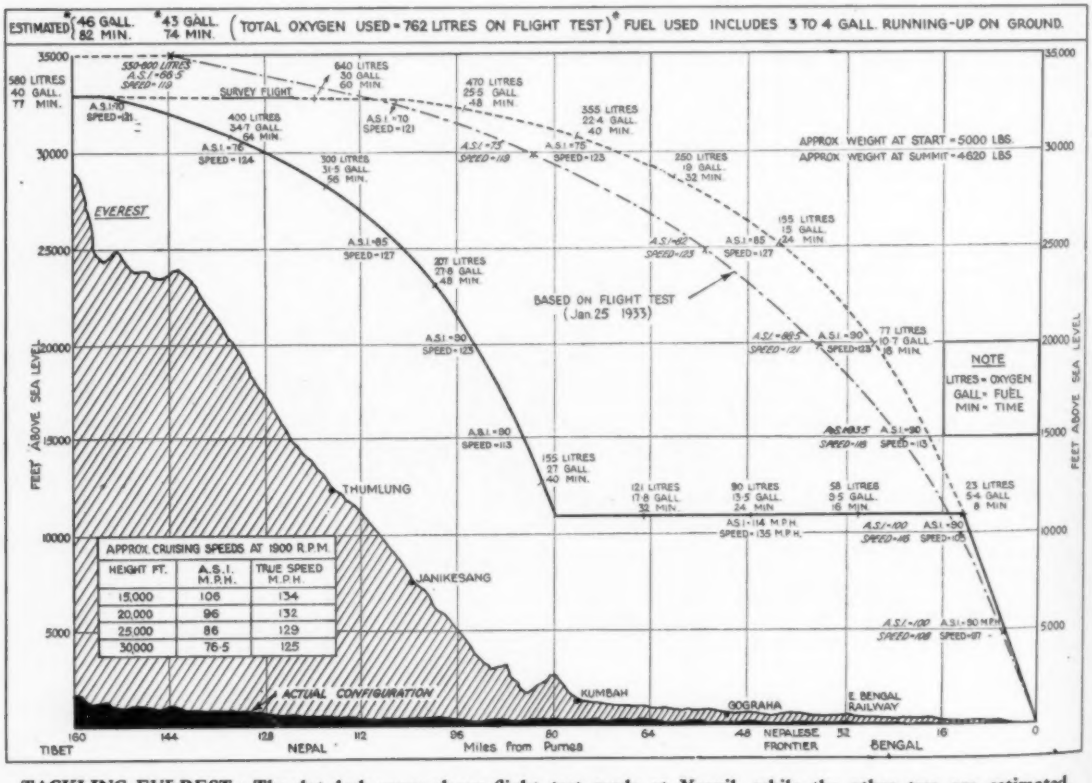
Duralumin is the material used in the construction of the wing structure, and the wing arrangement includes a top centre-section of fairly large span, and wing stubs in the lower plane. It should be noted that the "P.V.3" differs from most torpedo planes in that there are no sloping struts running from the inner interplane struts to the fuselage. The wings are arranged to be folded, the hinges and locking devices occurring at the points of attachment of undercarriage to lower wing. The inner interplane struts are of "N" formation and made of streamline steel tube, while the outer interplane struts are built-up duralumin construction with "Alpax" end castings. Handley-Page automatic wing tip slots are fitted in the upper wing, and lower as well as upper wing is fitted with Frise-balance ailerons.

The fuselage of the "P.V.3" is of usual Westland type of construction, in which the tubular members employed are jointed together by bolting. Square-section tube (with rounded corners) is used almost throughout. The engine is carried on a steel tube structure incorporating "Silentbloc" suspension.

In its military form the "P.V.3" carries a large equipment in the form of front and rear guns, bombs or torpedo. Oxygen equipment, camera, gun, wireless, photographic equipment, gear for picking up messages, all according to the particular function for which the machine is being used.

For the Houston-Mount Everest flight the "P.V.3" was selected on account of its high ceiling (more than 34,000 ft.) and for the large space in the rear cockpit, which gives the observer ample room to move about during his work of using the fixed camera and the hand-held cine camera.

Some of our photographs illustrate the modifications which have been made to the machine to make it suitable for the Everest flight, and the special equipment which the machine will be called upon to carry. From the photographs it will be noted that the aft cockpit has been entirely covered in. The hinged door in the roof of the observer's cockpit is arranged to fold inwards, so that if the observer should at any time during the flight want


ESTIMATED 46 GALL. 82 MIN. 43 GALL. 74 MIN.
(TOTAL OXYGEN USED = 762 LITRES ON FLIGHT TEST)* FUEL USED INCLUDES 3 TO 4 GALL. RUNNING-UP ON GROUND.
580 LITRES 40 GALL. 77 MIN.
550-600 LITRES A.S.I.=66.5 SPEED=110
SURVEY FLIGHT
640 LITRES 30 GALL. 60 MIN.
470 LITRES 25.5 GALL. 48 MIN.
355 LITRES 22.4 GALL. 40 MIN.
400 LITRES 34.7 GALL. 64 MIN.
300 LITRES 31.5 GALL. 56 MIN.
250 LITRES 19 GALL. 32 MIN.
155 LITRES 15 GALL. 24 MIN.
207 LITRES 27.8 GALL. 48 MIN.
155 LITRES 27 GALL. 40 MIN.
121 LITRES 17.8 GALL. 32 MIN.
90 LITRES 13.5 GALL. 24 MIN.
58 LITRES 9.5 GALL. 16 MIN.
23 LITRES 5.4 GALL. 8 MIN.
77 LITRES 10.7 GALL. 18 MIN.
APPROX. WEIGHT AT START = 5000 LBS.
APPROX. WEIGHT AT SUMMIT = 4620 LBS.
EVEREST
BASED ON FLIGHT TEST (Jan. 25 1933)
NOTE
LITRES = OXYGEN
GALL. = FUEL
MIN. = TIME
THUMLUNG
JANIKESANG
KUMBAH
GOGRAHA
E. BENGAL RAILWAY
ACTUAL CONFIGURATION
APPROX. CRUISING SPEEDS AT 1900 R.P.M.
HEIGHT FT. | A.S.I. M.P.H. | TRUE SPEED M.P.H.
15,000 | 106 | 134
20,000 | 96 | 132
25,000 | 86 | 129
30,000 | 76·5 | 125
FEET ABOVE SEA LEVEL
Miles from Purnea
TIBET
NEPAL
NEPALESE FRONTIER
BENGAL

TACKLING EVEREST: The dot-dash curve shows flight test made at Yeovil, while the other two are estimated, the upper being a normal climb to height curve while the lower is the type of approach it is intended to use.

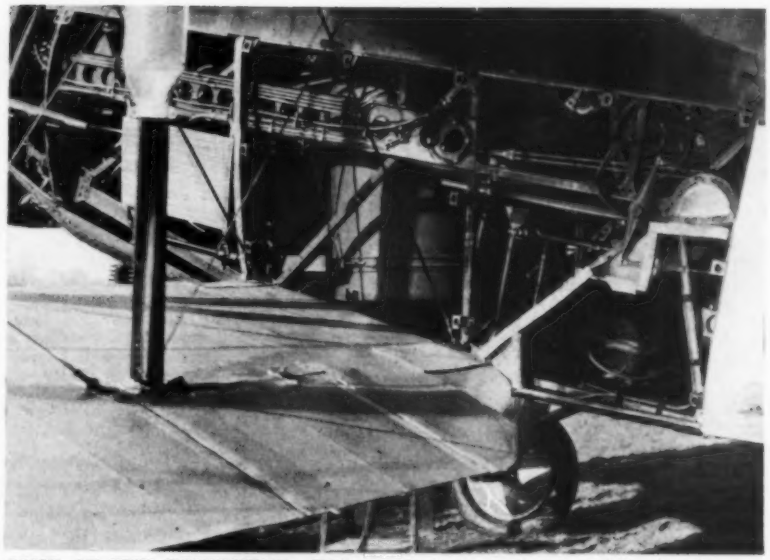
to get his head out in the open, the doors will not flap about in the slipstream. The circular windows in the roof door can be seen in one of the photographs.

The crew, which during the actual flight over Mount Everest will consist of the Marquis of Clydesdale (pilot) and Lt. Col. Blacker (observer and photographer), wears electrically-heated clothes and gloves, and the cockpits are further protected against cold by three-ply walls added inside the fuselage structure proper. Particular care has been taken in the design of the flight controls, to ensure that uneven rates of contraction shall not render them inoperative at great heights.

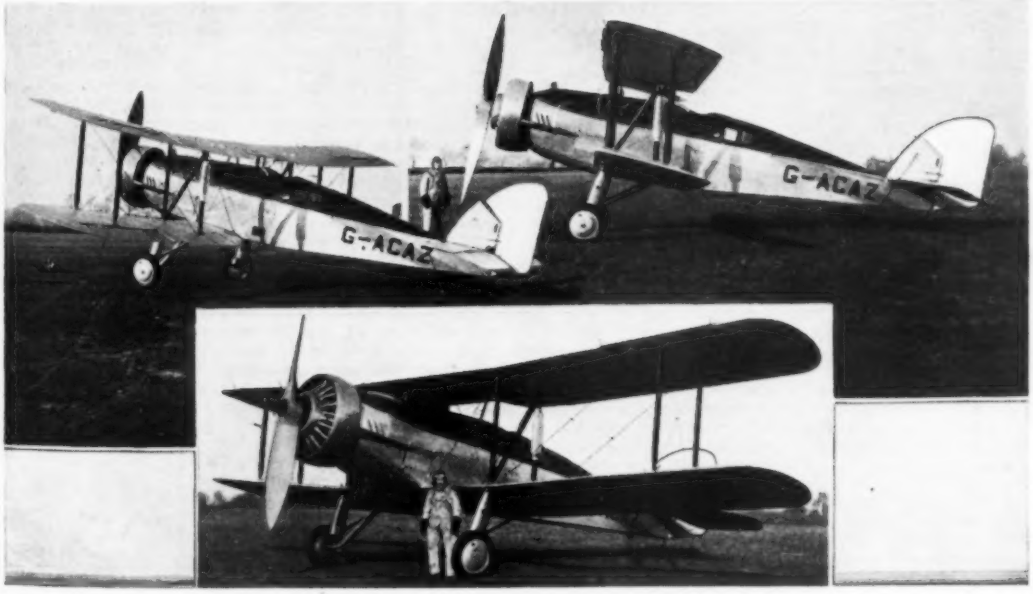
As used on the Everest flight, the "P.V.3," or, as it has now become, the "Houston-Westland," has a tare weight of 3,580 lb. The load carried will consist of: Crew and heated clothing, etc., 380 lb.; oxygen, cameras, etc., 206 lb.; fuel and oil, 704 lb. This gives a gross weight of 4,870 lb.

The "Houston-Westland" has now been shipped to India, and work is proceeding on a second machine to act as "second string." This is of the Westland "Wallace" type, as supplied to the British Royal Air Force. Being of the "General Purpose" class of aircraft, the "Wallace" had similar advantages for the Everest flight as the "P.V.3," and it is now being modified for the work. The engine of this machine is also a Bristol "Pegasus" S.3.

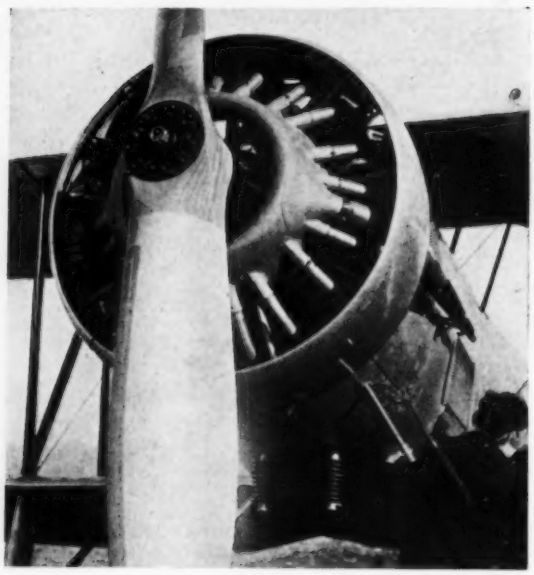
The chart published on page 94 is of considerable interest, and merits a close study. It will be seen that on it is drawn a sil-



SOME OF THE EQUIPMENT: With the fuselage panel removed the interior can be inspected. Note the Williamson camera in its electrically-heated jacket. Below, Lord Clydesdale and Lt. Col. Blacker in altitude kit. (FLIGHT *Photos.*)



FOR MOUNTAINEERING IN COMFORT: Three views of the "Houston-Westland." (FLIGHT *Photos.*)



houette of Mount Everest, and three separate curves. The dot-dash curve shows the results of a flight test made by Mr. Penrose at Yeovil, but plotted on the assumption that the machine was flying from its base in the same direction the whole time. This was not, of course, actually the case. The other two curves show two methods of getting over the top of Mount Everest. Both represent estimates made before the test flight was carried out. The upper curve shows the results which would be obtained by a normal climb to height, while the lower curve represents the actual method which it is proposed to use in order to get close enough to the mountains to be able to take photographs on the way up. It will be seen that after reaching an altitude of 11,000 ft., which is the rated altitude of the Bristol "Pegasus" S.3 engine, the machine will be flown level towards the mountains, and then when a certain point has been reached the climb will be resumed until the machine has crossed the summit of Everest.

THE BRISTOL "PEGASUS" S.3: After 44,000 ft. in the "Vespa," 35,000 ft. in the "Houston-Westland" should not worry it. (FLIGHT *Photo.*)

SPECIAL MEETING OF THE FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE

A SPECIAL Meeting of the Fédération Aéronautique Internationale was held in Paris at the Aero Club de France, on January 10 and 11 last. Prince George Bibesco, the President, presided, and 46 delegates, representing 21 countries, attended. The Federation names as its official member in Cuba the Club de Aviacion de Cuba.

The Grand Gold Medal of the Federation for 1932, which is awarded annually to the person contributing most to the progress or development of aviation during the preceding year, was bestowed upon Juan la Cierva, the inventor of the "Autogiro." The names of the other candidates presented for the award of this medal were Professor Piccard, Miss Amelia Earhart, Mrs. Mollison, and Wolfgang von Gronau.

It was voted to put in practice the International Guaranty Bonds, to be issued by the various Aero Club members of the Federation, which can be presented to claimants for damages to persons or property, caused by aviators being obliged to make forced landings, outside of regular landing fields, in foreign countries. These bonds will be issued in amounts up to 10,000 francs, and will be carried by the airmen together with their other papers required for international formalities. In the event of damage done to persons or property, due to forced landings, it is proposed that the air tourists leave one of these bonds for the amount of the damage demanded, and the claimant can then apply to the Aero Club of the country, in which the alleged damage has been done, for settlement of the matter. The Aero Clubs, in turn, will take out policies themselves with insurance companies of their respective countries and turn these claims over to them for adjustment. Air tourists will thus be saved much time and annoyance.

The Contest Committee of the Federation voted that the prize of 5,000 francs offered by Prince Bibesco shall be awarded to the tourist plane in which it is possible to converse in the easiest manner without being hampered by the noise of the motor. The competition for this prize will be held during the next International Tour of Tourist Planes (Challenge International de Tourisme).

The meeting adopted a resolution defining machines having auto-rotative wing surfaces as follows:—"An aerodyne in which the sustaining force is furnished entirely or for the most part by an auto-rotative surface. In the latter case the wing surface which turns must be greater than the wing surface which is fixed (stationary)."

The meeting also adopted a resolution defining the records made in long-distance flights. These records must be made over a course accepted by the Federation (F.A.I.) and supervised according to the regulations of the Contest Committee. The course can be included in only one or can extend over several countries. These will be speed records with landings authorised, but the duration of the time of these landings will not be deducted from the flying time. These records will be accepted without taking into consideration any classification or catagory of the planes making them. For example, New York-San Francisco, London-Capetown, Paris-Saigon, Paris-Teneriffe, Amsterdam-Batavia, Friedrichshafen-Rio Janeiro, Rome-Capetown, Rome-Rio de Janeiro. [Australia appears to be "off the map!"—ED.]

It was also decided that records could be established between two capitals, Tokyo-New York, Buenos Aires-London, Paris-Berlin, but consideration will only be given to flights that cover a distance of more than 2,000 kilometres (1,250 miles).

Some modifications were authorised to the rules governing the Challenge International de Tourisme (International Tour of Tourist Planes), as follows:—Only light planes of the first category will be admitted. The weight of these planes at the present time is limited to 400 kg. (880 lb.). Beginning April 1, 1933, however, planes weighing 560 kg. (1,234 lb.) or less will be admitted.

On the motion of the Aero Club of Poland, who will be the organiser of the International Tour (Challenge) for 1934, the meeting voted that each Aero Club could enter only four planes for each vote that it possessed in a Convention of the Federation. (For instance, large countries such as France and Germany that have four votes each will be entitled to enter 16 planes apiece; Switzerland, on the other hand, having but two votes, can only enter four planes.) For each additional plane above those authorised by this regulation the Aero Club members of the Federation must pay a participating fee of 2,500 francs. If a club enters a plane from a foreign country, this fee shall be raised to 5,000 francs.

R. C. W.

Skis for Aircraft

By R. N. BELL

The Author of this article has spent some time in Canada, and while there designed and built, with Mr. G. W. Saynor, the little "Canadian Cub" single-seater light plane (A.B.C. "Scorpion") which was described in our issue of May 1, 1931. Mr. Bell has now returned to England, having found little scope for his particular abilities in Canada under present conditions. His experience of Canadian aviation should be of some value to any British aircraft firm which is doing business with Canada, or is contemplating doing so.

SINCE many British aircraft have, at various times and in various places, been operated on skis, and, to the best of the writer's belief, few of these skis have been made in England, it has occurred to him that a few notes on the above subject would not be out of place in the columns of FLIGHT.

The matter given below is based entirely on experience in Canada, but it seems likely that skis which are suitable for that country will be equally suitable wherever snow or ice conditions necessitate their use.

It seems hardly necessary to state that it is found, when snow is more than a few inches deep, that the acceleration over the ground of an aeroplane fitted with wheels is retarded to such an extent that it will not take off, and attempts to do so are liable to result in a nose-over. It should be stated that snow conditions vary considerably and are subject to the state of the weather. At times, when the temperature is low, the snow is dry and powdery and makes excellent conditions for skis, whereas, when the weather is warmer and the snow becomes wet, friction becomes greater and take-offs longer. Again, when the snow becomes slush, conditions may be such, in the absence of a prepared runway, that it is impossible to take off with either wheels or skis. It is often possible to land successfully on fairly deep snow with wheels if the chassis is situated well forward to suit braking requirements, but it would be unwise to rely on always being able to do so. On the other hand, a landing with skis on soft wet ground would almost certainly end in disaster, but, on hard, frozen ground, providing it is fairly smooth, the chances are in favour of a successful landing. These points are mentioned because it often happens that a machine makes a trip from one place which is snowbound to another where there is no snow. A combined ski-wheel gear seems to be the solution to this problem, and such a gear has been made, though it has not, as yet, been put into production. It possesses one of the drawbacks also inherent in an amphibian gear in that the weight of the landing gear is increased, and it is only necessary under special conditions.

The usual form of aeroplane ski consists of a wooden base to which is attached a pyramidal steel tube structure of approximately the same height as the radius of the wheel, and at the apex of which is a tubular sleeve of the same length and bore as the wheel hub. A sketch of a simple form of ski is shown in Fig. 1. The size of the ski is determined by the weight of the aircraft, and, to a certain extent, by its characteristics and the conditions under which it is to be operated. Obviously, a machine with a low power loading can be operated successfully with a higher ski loading than can one with a comparatively high power loading, such as a light aeroplane. Aircraft which are only to be operated where dry snow prevails can, likewise, use smaller skis than would be recommended for use in localities where snow conditions are variable. Extremes of loading are 120 and 200 lb. per sq. ft. The former is met with on light aeroplanes and heavily loaded machines, and the latter on aircraft operating under especially favourable conditions. The area taken for calculation purposes is the flat portion of both main skis and the tail ski. The official recommendation of the Department of National Defence is 150 lb. per sq. ft.

Skis are liable to stick to the snow when left standing for any length of time due to the heat generated by the pressure and the consequent softening of the snow, and, although a small machine can easily be freed, it sometimes becomes a serious problem on large aircraft operating with a small crew at long distances from assistance, and is one of the objections to the employment of large aircraft in the Canadian Northern Territories. Whilst on the subject of the freezing down of aircraft, it is not out of place to mention that the obvious temptation is to lift the tail and attempt to free the main skis by swinging. Needless to say, this is liable to induce entirely unpermissible stresses in the chassis, and is not the solution. A coating of wax spread on the under surface of the skis will assist materially in preventing them from sticking to the snow, but the wax soon wears off and, at the best, it is a tedious matter to be constantly replacing it.

The nose of the ski is turned up some 6 in. or more in order to avoid picking up snow when moving over the ground, and the rear end is often raised a few inches, too, so as to prevent the ski digging into the snow when the aircraft is being man-handled stern first. Runners are sometimes fitted, as illustrated in Fig. 1, and these may be covered with thin sheets of brass or duralumin in order to lengthen the life of the ski. It is also advisable to cover the toe of the ski with a thin steel plate in order to protect it from wear and damage.

Standard practice is to give the ski base an aspect ratio of $3\frac{1}{2}:1$, that is, considering only the flat portion of the ski. Some manufacturers taper the base slightly,

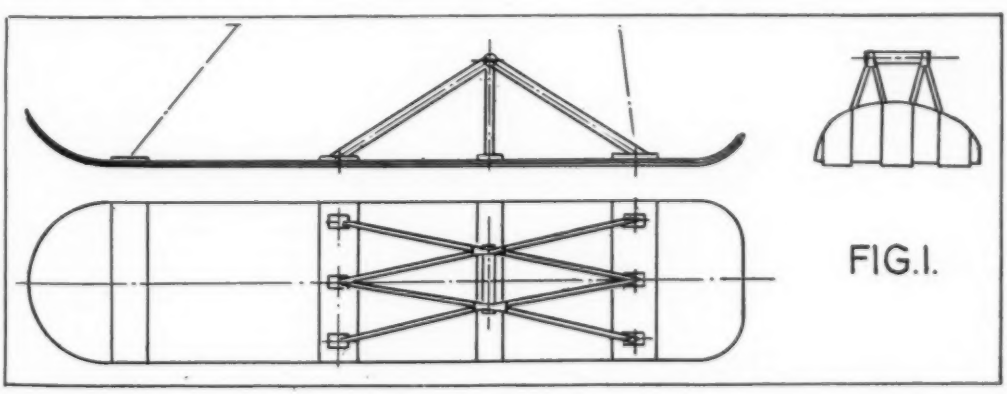


FIG. 1.

FIG. 2.

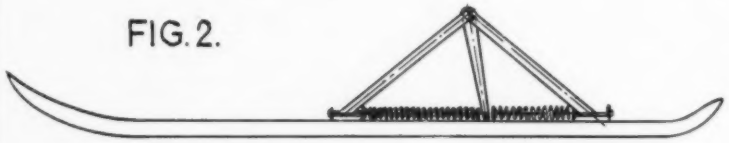
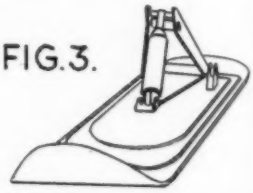


FIG. 3.



in plan, towards the rear to improve steering qualities, and all skis are so mounted that approximately two-thirds of the contact area is ahead of the point of support, *i.e.*, the axle. This is essential to permit of directional control whilst taxying.

The ski is mounted on the axle and is free to rotate on it under the restraint of the fore-and-aft stays. These stays consist of flexible cable, with which is incorporated a length of shock-absorber cord. The upper ends of the stays are attached to adjacent structural points, usually on the fuselage. To rig the ski, the aircraft is trestled or slung, and the stay cables fitted and so arranged that the ski, when free, is parallel to the wing cord. Under this condition both rear and front shock-absorbers must be under tension. The front check cable should be of such a length that it will permit the nose of the ski to drop at least 10 deg. below its normal position when the aircraft is on the ground with the tail down. The rear check cable should also be long enough to allow the rear of the ski to drop at least 10 deg. below its attitude when the fuselage is horizontal. That is to say, if the aircraft has a difference in attitude between tail up and tail down of 12 deg., the skis should be rigged to rotate through 32 deg. against the rubber cord. The extra movement is to allow for taxying over rough ground.

The ski is rigged as described so that it will have the minimum disadvantage effect aerodynamically. As can be readily understood, if the skis are rigged too low by the nose, the excessive drag tends to depress the nose of the aircraft in flight. Cases have occurred in which a front stay has broken causing the ski to present most of its surface to the direction of flight, and if these breakages have not been the cause of serious accidents it has only been due to the exercise of considerable skill on the part of the pilots concerned, and not a little to their muscular efforts! As a matter of fact, rubber is not a suitable medium for use in very low temperatures, as it becomes brittle and loses its characteristic qualities.

A type of ski has been designed and used very successfully which avoids external stays altogether. This ski is illustrated in Fig. 2. The pedestal is sleeved over and free to rotate on the axle in the usual way. In addition, a lever, the same height as the pedestal, is rigidly bolted to the axle over the centre line of the ski, and extends downward to the top of the base, where it picks up two coil springs mounted longitudinally along the top of the ski, one running forward from the lever and one aft, thus restricting the movement of the ski and maintaining it in the correct attitude in the air.

Skis are also used quite successfully whose bases are not flat, but have their edges raised so that, in cross-section, the central third is flat and the outer thirds slope upwards and outwards as much as 20 deg. This feature helps to prevent the aircraft from skidding sideways and also to improve steering qualities, but results in high pressure on the contacting portion of the ski in shallow snow.

Bases are made of suitable, resilient hardwood, such as ash, and adequately stiffened to take the stresses due to landing loads. Longitudinal beams running along the base proper may be used, or the base may consist of laminations of two or three laminæ decreasing in overall size. Fig. 3 shows this type of base, which is very flexible, and is admirable for large aircraft. For fastenings, copper nails are preferable to woodscrews, as the latter are liable to come out.

As regards the pedestal, this usually takes the form of a rigid steel tube structure designed to transfer the loads from the base to the axle. This structure should be very strong torsionally, as severe stresses can be induced when taxying over uneven snow or ice. It should not be forgotten, also, that the shock-absorbing properties of the pneumatic tyre are not usually replaced when skis are fitted, so that the landing loads in the aircraft structure are commensurately increased. Skis have been designed which embody rubber shock-absorbers to compensate for the loss of the tyre, but the extra complication, involving slides and housing, is considerable. Another type has a short oleo strut incorporated in the pedestal and extending from the axle towards the front of the ski; this type is illustrated in Fig. 3.

Skis are found to function quite satisfactorily when fitted to a split-type chassis in which the wheels have an appreciable toe-in under light loads, but, if through faulty design or manufacture the axles are not truly at right-angles to the fore-and-aft axis of the machine, an objectionable amount of slewing may be set up in addition to the likelihood of excessive torsional stresses in the ski frame being induced when taxying.

The tail ski can be made quite simply of wood planking or a duralumin plate bolted to the tail skid and of such an area as to have a similar loading to that of the main ski. The aspect ratio of the tail ski can be quite small and is often not more than two. The nose should be raised to ride over the snow and the mounting should be so designed that the ski is free to swivel laterally and also about athwartships axis being restrained in a similar way to that of the main skis, although for small machines a spring and check cable at the fore end will suffice, no stay at the rear being necessary. In fact, for light aircraft, a tail ski which is rigidly bolted to the skid can be used, providing it is suitably curved, as seen in side elevation, and can swivel laterally.

It is doubtful if any serious attempt has been made to measure the drag of a ski or to compare it with that of a corresponding wheel, but it is generally found that the performance of the aircraft is affected slightly adversely when wheels are replaced by skis. It must be pointed out, however, that the problem of making a low drag ski has never been seriously tackled, and it seems quite probable that a ski could be designed which would have no more drag than would have the corresponding type of wheel.

As regards weight, skis are, on the whole, heavier than wheels. It is difficult to generalise on just how much heavier skis are, on the average, than wheels, but, from what data the writer has available, it may be anything from 50 to 100 per cent. Speaking of Canada, if half-a-dozen machines of the same type were collected together, it would probably be found that no two of them were fitted with the same type of ski. Furthermore, with the development of the medium- and low-pressure tyred wheels the tendency is for the weight of this latter component to rise and so decrease the ski's disadvantage on the score of weight. As an example of a comparison of ski and wheel weights for a machine of 1,700 lb. total weight, the following may be quoted.

	lb.
Weight of high-pressure wheel	19
Weight of medium-pressure wheel with brake ..	29
Weight of ski (spring-restrained type)	32

Michael Arlen's New Book

MR. MICHAEL ARLEN, in his new book "Man's Mortality," dips into the future and sees airships travelling at 2,000 miles an hour, cutting through walls of steel and dealing death by bombs and electric rays. Air transport, Mr. Arlen contends, is going to have an incredible effect on future life. The latter perhaps, but airships at 2,000 miles an hour!—a flight of fancy at about the same speed.

THE PHYSIOLOGICAL LIMITATIONS OF FLYING

WING. COM. G. S. MARSHALL is a doctor in the Royal Air Force who, by virtue of his work on the Central Medical Board, has unique opportunities for studying the effects on pilots of matters like high altitude and acceleration.

Before the Royal Aeronautical Society on January 26 he delivered a most interesting lecture with the above title. He pointed out that due to the development of science it has now become mechanically possible for man to go far beyond his natural limits in many ways. In the matter of height, for example, the highest place at which man is normally found is only 18,000 ft. above sea level, but aircraft enable him far to exceed this figure. This, he affirmed, opened up new problems, for the conditions of atmosphere at, say, 43,976 ft. (the world's record altitude gained for Britain by Flt. Lt. Uwins in the Vickers "Vespa" ("Pegasus") on September 16 last year), are very different indeed from those at 18,000 ft. Wing. Com. Marshall showed many slides to illustrate this point, and explained that in respiration the function of the blood was to act as a carrier of oxygen from the lungs to the tissues, and of carbon dioxide from the tissues to the lungs. The blood was enabled to do this with respect to the oxygen, by the affinity which its colouring matter, hæmoglobin, had for oxygen.

Unfortunately, it appeared that its affinity for the deadly gas carbon dioxide was 300 times as great, with the effect

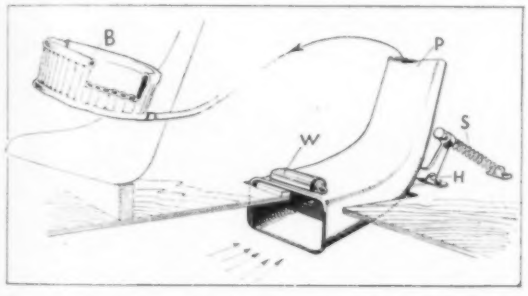


Fig. 1: Wing Com. Marshall's suggestion for abdominal support during "G"-producing manœuvres.

that minute quantities were lethal by supplanting the vitally necessary oxygen. The amount of oxygen taken up by the hæmoglobin was, the lecturer explained, to some extent a function of the pressure of the oxygen and, starting from saturation point at ground level, where the oxygen pressure is about 150 mm., this pressure falls off as the height increases.

Fortunately for pilots, man could exist with lower degrees of saturation than 100 per cent. Moderate exercise was possible for most normal men even when the pressure had dropped to 80 mm., but generally, distress would be felt if it dropped to 50 mm., while at 30 mm. most people would faint. At this point a graph showed that the oxygen available in inspired air, saturated with water vapour at body temperature, at 15,000 ft. was at approximately 80 mm. pressure while, generally speaking, the "fainting point" lay at about 22,000 ft. This pointed to 15,000 ft. as being the safety height for pilots without oxygen if they had to undergo any physical exertion, and about 18,000 ft. as the highest for normal persons unless oxygen was used.

The method of introducing this oxygen into the respiratory system was then discussed, and the normal way of allowing a stream of the gas to enter a mask held tightly over the mouth and nose was shown to be very wasteful, because as only about one-third of the cycle of respiration consisted of inspiration, and as the supply of oxygen was continuous, then some two-thirds of it was wasted during expiration. Furthermore, what was really wanted was not so much to increase the *amount* of oxygen as to increase its *pressure*, and this was not done with the usual outfit. Sir Leonard Hill, speaking later, expressed the opinion that the existing oxygen apparatus was very wasteful indeed, and it was absurd for people like the climbers who were hoping to surmount Mount Everest to use this type. Wing Com. Marshall, in reply, informed his listeners that they were to use a new type of regenerative apparatus which would utilise the supply of oxygen in a far more efficient manner.

Another graph showed that a person breathing pure oxygen at 42,000 ft. was under the same conditions as if he were breathing air at 15,000 ft., while breathing pure oxygen at 50,000 ft. would be the same as breathing air at 29,000 ft. From this the deduction was made that the safe height for a pilot whose duties entailed moderate exercise would, if he was breathing pure oxygen, be about 42,000 ft. and 44,000 ft. if he was simply going straight up and down again. In the discussion Flt. Lt. Uwins was of the opinion that he could with safety spend 40 to 45 min. at 44,000 ft. or go straight up to 47,000 ft. and down again.

For the purpose of flying at greater heights than these the lecturer advocated the use of closed, or adiabatic, cockpits, wherein the pressure could be kept at 430 mm., corresponding to a height of 15,000 ft. if air were to be breathed, or 130 mm. corresponding to 42,000 ft. if pure oxygen were supplied. It was advisable, he thought, to keep the pressure in any adiabatic cockpit low, as not only would this expedient lessen the risk of the cockpit collapsing but also tend to reduce the physical discomfort which might well be felt in such an eventuality.

Concerning the effects of increased rate of ascent and descent, Wing. Com. Marshall did not think that a rate of climb of even 8,000 ft. a minute would unduly tax a pilot. With regard to descent, complaints had been received from pilots after rates of fall of 2,000 ft. per min., but, on the other hand, power dives have been made at 30,000 ft. per min. without harmful effects. In the latter case he advocated that the pilot should glance at the passenger from time to time as a supply of oxygen, which might be adequate for him (the pilot) might well be insufficient for an observer working a camera or gun.

Turning next to the subject of acceleration, the lecturer did not think that straight flying presented any problems, but when it came to the question of angular deviation at high speed then he felt that we had already passed the safety limit. When, for example, making a properly banked but very sharp turn, or when pulling out of a fast steep dive, it was quite possible to load the body so much that very definite ill-effects were experienced. The most common of these were "blacking out" and redding out." The former took place under normal conditions when the centrifugal force acted from the pilot's head towards his seat, and the latter when the pilot's head was outwards, as in a "bunt" or outside loop.

These phenomena would appear to occur when forces of about 3½ to 4 g. were involved, although, of course,

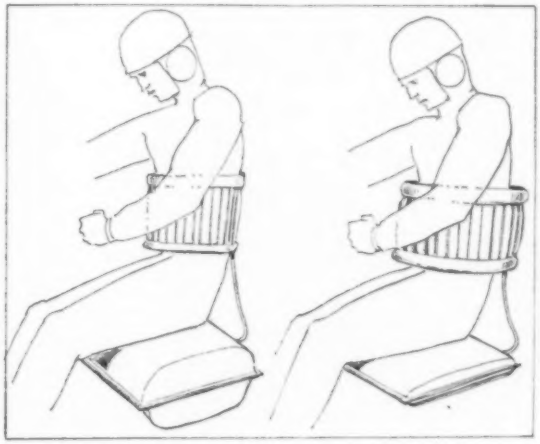


Fig. 2: An alternative suggestion for abdominal support. The pilot sitting on an air-cushion. When "g" presses him down on to the cushion the pressure will be transferred to his belt. Thus, the greater "g" becomes the more support he gets for his body.

pilots varied very much in this respect. This "blacking out" was attributed to anæmia of the eye from the pooling of blood in the relatively unsupported, and gravitationally lower, abdominal vessels. These conditions, it was thought, would, if allowed to continue for anything like 10 sec. cause fainting, but this view was to some extent negated by the experience of Wing. Com. Orlebar (in command of the High Speed Flight, 1929/31, Schneider Trophy Contests), who recounted that tight turns had been made for much longer periods than 10 sec., while the pilot was "blacked out," without any tendency whatsoever to lose consciousness.

With regard to preventive measures to overcome these awkward phenomena, the lecturer thought that a lot could be done by bracing the abdomen, either by training or by the use of a flexible belt or corset. He then showed a slide of an inflatable corset (Fig. 1), which he suggested might meet the case. The scoop (P) would normally be held into the aircraft, clear of the slipstream, by the spring (S), but when in a tight turn the centrifugal force acting on the weight (W) would overcome the spring and force the scoop outwards, through the bottom of the aircraft, about the hinge (H). This would have the effect of conducting air under pressure to the inflatable corset (B) around the pilot's abdomen, and thus supporting him until such time as the centrifugal force was relieved, the spring then coming into play and returning the scoop. Without wishing in any way to belittle the efforts of Wing Com. Marshall who, self-admittedly, is somewhat an amateur designer, we feel that unless a means were incorporated for releasing the slipstream pressure on the scoop, his device would prove unstable and would, when once out, stay out. A release flap could undoubtedly be incorporated, but we feel that designers would hardly take kindly to any idea which increased the drag of their aircraft just when its absence was most desired. We therefore offer an alternative suggestion which, although crude, at least has the merit of being entirely automatic and self-regulating (see Fig. 2). In practice we imagine that a better means of operation would be for the pilot's seat to be mounted upon slides in such a way that centrifugal force would act upon it, and it would, by its motion, work a hydraulic ram situated behind it. This ram could, by a system of levers and graduated rams, be arranged to give any desired degree of pressure in the corset. A regulating valve would have to be included in the specification, for unfortunately the 3½ g. of some pilots we know, would be far greater than others! (The surface loadings would probably be about the same!—ED.) Incidentally, it should not be impossible to incorporate a hand pump in the system, which would act on the bottom of the ram, with a by-pass to short circuit the belt, and thus provide an adjustable seat for landing or observation purposes.

WITH THE FLEET AIR ARM: The only British aircraft carrier with a completely clear deck—H.M.S. *Furious*—is shown here as seen from one of her aircraft, which is circling preparatory to landing on. The carrier is steaming at high speed and dead into wind. This is ascertained from the steam jet lying accurately along the centre line of the lower flying-off deck. This photograph was taken during the Home Fleet exercises in the Mediterranean. The escort is the destroyer H.M.S. *Walpole*.

THE ROYAL AERO CLUB OF THE UNITED KINGDOM

OFFICIAL NOTICES

REPORT of the Meeting of the Committee of the Royal Aero Club held at 119, Piccadilly, London, W.1, on January 25, at 5 p.m.

Present.—Lt. Col. Sir Francis McClean, A.F.C., in the Chair; Com. James Bird, O.B.E.; Lt. Col. M. O. Darby, O.B.E; Maj. C. J. W. Darwin, D.S.O.; W. Lindsay Everard, M.P.; Capt. A. G. Lamplugh; John Lord; Capt. C. B. Wilson. In attendance, H. E. Perrin, Secretary; B. Stevenson, House Secretary.

Election of Members.—The following Members were elected:—Kenelm Joseph Godfrey Bartlett, Douglas Warner Bond, Mark Buxton, William Cannell, Norman Wallace George Edgar, Douglas Keith Fairweather, Roland John Falk, Guy Sant Fournier, Hugh Sant Fournier, George Hubert Wilson-Fox, A. S. Gallimore, Anthony Bridgeman Gibbons, Algernon Marshall Daryk Grenfell, James Ira Thomas Jones, Charles Lancelot Layland, Kenneth Edward Lloyd, The Most Hon. the Marquis of Londonderry, K.G., M.V.O., T. G. Mapplebeck, James Allan Mollison, William Gerald Moyers, Tristram Ford Owen, Archibald Harry Pass, Eric Frank Rogers, Samuel Philip Symington, Nigel Trevithick Tangye, Maj. Gen. The Right Hon. John E. Bernard Seely, P.C., C.B., C.M.G., D.S.O.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

10,890	James Henry Baird	Eastern Counties Ae.C.	10.12.32
10,891	Henrietta Learmont MacEwan	Eastern Counties Ae.C.	8.12.32
10,892	Charles Edell Scott	Eastern Counties Ae.C.	10.12.32
10,893	Walter de Molesworth Dyson-Laurie	Leicestershire Ae.C.	10.12.32
10,894	Richard Vernon Cholmondeley	London Ae.C.	4.12.32
10,895	Erich Joseph Eberhardt Hahn	Hanworth C. (N.F.S.)	12.12.32
10,896	Ralph Blair Whitehead	Herts & Essex Ae.C.	10.12.32
10,897	George Bulwar Shrubsall	Rollason Muir & Co.	3.3.32
10,898	Ronald Clifford Freaker	Hampshire Ae.C.	13.12.32
10,899	Geoffrey Dudley Sanders	Eastern Counties Ae.C.	13.12.32
10,900	Gordon Douglas Drake	Eastern Counties Ae.C.	13.12.32
10,901	Stanley Cecil Thorp	Airwork School of Fl.	6.12.32
10,902	Serge de Borchgrave	Phillips & Powis	29.11.32
10,903	Dudley Graham Henderson	Leicestershire Ae.C.	12.12.32
10,904	Keith Kerby	Hampshire Ae.C.	9.11.32
10,905	Alwyn Charles Baker	Cinque Ports Flying C.	7.12.32
10,906	John William Newbury Coles	Wiltshire School of Fl.	15.12.32
10,907	Annie Cathleen Elizabeth Nelson	Hanworth C. (N.F.S.)	16.12.32
10,908	Dorothy Mary Clayton East Clayton	Hanworth C. (N.F.S.)	22.12.32
10,909	Francis Victor Webb	Northern Air Transport	21.12.32
10,910	Charles Graham Thompson	Brooklands School of Fl.	20.12.32
10,911	Charles Loraine Carlos Clarke	Leicestershire Ae.C.	24.12.32
10,912	Arne Lund Jorgensen	Hampshire Ae.C.	6.1.33
10,913	Horace William Devereux Londgen	Phillips & Powis	5.1.33
10,914	William Durant Campbell	Air Service Training	3.11.32
10,915	George Goodhew	Maidstone Fl. School	8.1.33
10,916	Reginald Paul Opie	Cinque Ports Fl. C.	4.1.33
10,917	Reginald William Wise	Scarborough Ae.C.	5.1.33
10,918	Nicholas Hardcastle	Newcastle-on-Tyne Ae.C.	14.1.33
10,918A	Joan Jenkinson	Hanworth C. (N.F.S.)	4.1.33
10,920	Thomas Walker Stewart	Cinque Ports Fl. C.	22.12.32
10,921	Albert James Walker Stead	Liverpool & Dist. Ae.C.	8.1.33
10,922	Bhaskar Sadashiv Soman	Hanworth C. (N.F.S.)	14.1.33
10,923	Maurice Frederick Mason	Liverpool & Dist. Ae.C.	1.1.33
10,924	Roy Fortescue Hitchins	Gravesend Ae.C.	13.1.33

The Committee considered the following reports:—*F.A.I. Paris Conference* by Col. M. O'Gorman, C.B. *Cautionary Arrest of Aircraft while Touring Abroad* by Maj. A. R. Goodfellow. *Barriers to Air Traffic* by H. E. Perrin.

Britannia Trophy.—The Committee unanimously awarded the Britannia Trophy for the year 1932 to Capt. Cyril Frank Uwins. Capt. Uwins, on September 16, 1932, on a Vickers "Vespa" aircraft, fitted with a Bristol "Pegasus" engine, accomplished an altitude of 13,404 metres (43,976 ft.), the world's altitude record for aeroplanes.

Segrave Trophy.—Capt. A. G. Lamplugh and H. E. Perrin were appointed to represent the Club on the Awarding Committee of the Segrave Trophy.

Annual General Meeting.—The Annual General Meeting of the Club was fixed for Wednesday, March 29, 1933.

Medical Air Service

So much has been heard lately, from people with more imagination than common sense, about the menace of flying to civilisation, that it is a pleasure to record a very humane use to which aeroplanes have been put in Australia. The "flying doctor" system which has, during the last four years, enabled medical aid to be given those who suffered from disease or accident in remote parts of the Continent, is to be widely extended. The service was established in May, 1928, at Cloncurry, Queensland, and was worked in conjunction with wireless. Small and cheap transmitters were distributed in isolated homesteads; their range was 600 miles. At first the family operator was obliged to learn Morse, but later the message was automatically translated from a keyboard like a typewriter. Sometimes advice would be wirelessed back, but often a machine was despatched with a doctor, and perhaps a nurse as well. Soon a larger aircraft is to be acquired which will be fitted out for anæsthetic work, and surgical operations. An aerial survey will also be made of fresh areas, so far unchartered, more landing grounds will be made, and wireless stations installed. In the first year of this ambulance service one "flying doctor" travelled 20,000 miles by air, which is not far off a daily flying average of one hour, not bad going for a doctor. He attended 255 patients and held 42 consultations in 26 centres.

Air Pageants for British Hospitals

LED by Mr. Charles W. A. Scott, who holds the world's record for his flight from England to Australia, a series of about 200 consecutive Air Pageants, organised by British Hospitals' Air Pageants, is to be held this summer in various parts of Great Britain with the object of raising funds for local hospitals. H.R.H. Prince Arthur of Connaught, the Duchess of Atholl, Lord Derby, Lord Harewood, Lord Moynihan, Lord Burnham, Sir William Morris, Capt. the Rt. Hon. F. E. Guest, M.P., the Hon. Sir Arthur Stanley and the Master of Sempill are among those who have given their patronage to the campaign which is to commence in April and will continue until October. Visits to all the principal towns in England, Scotland and Wales are being arranged, and at each Pageant about 15 aircraft of different types will take part in a programme of twenty entertaining and instructive events. The opportunity for the public to make flights will also be provided. The aircraft will include the actual machine in which Mr. Scott set up his record flights to and from Australia, and many famous pilots will be actively associated with the programme. As a result of the tour, it is hoped that the hospitals will benefit to the extent of at least £20,000. The campaign, which has the support of the President and Chairman of the British Hospitals' Association, will open and finish in London.

Sir Harry Brittain's Air Tour

SIR HARRY BRITTAIN intended to leave London on January 31 for a 16,000 mile air tour to Capetown and back. He will travel in the "Artemis," the new Imperial Airways machine, and intends to make a study of modern air transport for a book on commercial aviation development.

Secretary for Air in Rome

LORD LONDONDERRY, Secretary of State for Air, arrived in Rome on January 29 on his way home from Iraq. He arrived at Brindisi in the morning, and flew to Rome in an Italian machine placed at his disposal by the Italian Government.

From the Clubs

LONDON AEROPLANE CLUB

DURING the indisposition of Maj. Travers who is down with "flu," Mr. Nigel Tangye has been carrying on with instruction. Mr. De Bruyn recently made his first solo flight and hopes to obtain his "A" licence before going back to India. The House Dances on February 4 and March 4 have been cancelled, but on February 25 a dance is being held in the clubhouse at which members are requested to wear evening clothes.

BROOKLANDS

The year 1932 has been a successful one for Brooklands; it opened with two pupils arriving on January 1, when the School was supposed to be closed for holidays, and demanding dual instruction; fortunately, Capt. Davis was at his home in Weybridge, so he came over and gave the required lessons.

The "Shop" on the aerodrome, which was opened in early spring, has done a considerable amount of business, and has proved a great convenience. The idea is no novelty, for in 1910 the "Blue Bird" was open to supply tea to those who desired it.

The new clubhouse and control tower were built during the beginning of the year, the architect being Mr. Graham Dawbarn, F.R.I.B.A., and they were officially opened on May 28. On this same day there was held an air display, which, in spite of the wet weather, was well attended. All through the summer a series of "At Homes" was held at which different types of machines were on view. The King's Cup Race started from Brooklands on July 8, which proved a great attraction.

The College of Aeronautical Engineering Flying Club and the Press Aero Club were both started in 1932, the former being run entirely by students of the College, and the latter being formed so that journalists might be enabled to have instruction at special rates.

During the winter indoor lectures proved a great attraction under the supervision of the Ground Instructor. On November 5 an Aerial Guy Fawkes Day was held, the centre of attraction being a guy who was dropped by parachute. At the end of October the new *Brooklands Magazine* was published for the first time, while at the end of the year a mysterious disturbance on a corner of the aerodrome turned out to be the erection of the new hangar for the College of Aeronautical Engineering.

Turning to more recent times, an added attraction lately has been the frozen ponds on the edge of the aerodrome which have seen more spins and half rolls in the last week than has the atmosphere above in the last month, not to mention other gyratory movements never undertaken in the air; happily the results of coming down out of control on the ice are not generally serious, though sometimes not entirely devoid of attractions. New pupils include Herr Cogan from Vienna, and Mr. Litsas from Greece. Mr. Mayer, who has been under instruction for some time, made a successful first solo on Sunday, and is now on his way to China. Mr. J. W. Massey, Works Manager and Director of Brooklands Aviation, Ltd., is to be congratulated on being appointed a Director of the Aeronautical Educational Trust. The Spartan "Cruiser" (three "Gipsies") came to Brooklands on Thursday night and left the next day; during its short stay all the Brooklands pilots seized the opportunity to try it out. Mr. R. O. Shuttleworth, the racing motorist, has just acquired an extremely attractive "Gipsy III" Comper "Swift"; it is all white and has a Fairey metal airscrew. He proposes to fly it to India, take part in the Viceroy's Cup Race, and then fly home again.

HANWORTH (N.F.S.)

Bad visibility has again restricted flying during the week, though Lt. H. Kidston successfully passed his tests for "A" licence, and Mr. Farquharson carried out his for "B" licence. Mr. Burnside, who is taking an instructor's course, flew on Thursday to Southampton and return. Other members flying during the week included Lord Clive, Lady Clayton East Clayton, Dr. Erick Hahn, and Mr. Fitzwilliams. On Saturday evening, February 4, a dinner will be held in the Club House, after which there will be a debate on the subject of furthering the interests of private flying. Anyone who would like to attend should apply to the Secretary if they are not members of the Club.

NORTHAMPTONSHIRE AERO CLUB

Everyone will be glad to hear of the successful formation of the new Northamptonshire Aero Club, which will take the place of the old club closed down owing to a variety of reasons connected with depressions. Owing to some sterling work put in by some of the oldest and keenest members, under the leadership of Lord Willoughby de Broke, M.C., the Club once more exists under the control of Brooklands Aviation, Ltd. The inaugural general meeting was held on January 18, and was well attended, in spite of the bad weather. A committee was appointed to deal with all branches of the Club's activities, and it was decided that the premises, which have been improved and brightened considerably, should open on February 4. Mr. S. A. Thorn, of Brooklands, will be the new instructor and the rates for flying will be, per hour:—Dual, £2; solo, £2, which will be lowered progressively as the hours solo increase; blind flying, £3. The subscriptions will be three guineas for flying members and one guinea for associate members.

The Club has now been redecorated and generally polished up, the work being given to local people in the hope that, as the Club has interested itself in them, they will interest themselves in the Club. The original arrangements made for the dance and "At Home" have been altered. A dinner and dance will take place on February 11 and the "At Home" on February 12.

READING AERO CLUB

The annual "At Home" of the Reading Aero Club has been provisionally fixed for Saturday, May 27, and it is hoped that as many as possible will attend.

NORFOLK AND NORWICH AERO CLUB

In spite of hard times and depressions, the past year has been quite a successful one for the Club; among other improvements during the year has been the number of women pilots, which has increased. Also great strides have been made in aerial photography, which has been carefully studied and is now a great source of income.

Last January the aerodrome was taken over by the Norwich Corporation and levelling operations were started at once, which, when finished, should result in one of the best aerodromes in the country.

Through the generosity of the Club President, Mr. H. N. Holmes, the Lord Mayor of Norwich, the Club has been able to replace its aircraft with three new machines, two "Gipsy Moths" and a "Cirrus Moth," which were officially received by the Director of Civil Aviation, Lt. Col. F. C. Shelmerdine.

Social events during the year included Sir Alan Cobham's circus, the *Morning Post* Air Race, in which the Club was made the control, a visit of H.R.H. Prince George, making the fourth Royal visit in so many years, and the much-discussed Pilot *v.* Pigeon race. Another interesting event was an altitude record set up for the Club by Mr. S. Hansel, who reached 19,200 ft. solo and 15,400 ft. with a passenger, flying a Club "Gipsy Moth."

EASTERN COUNTIES AEROPLANE CLUB, LTD.

During the year 1932 the Club has had 84 flying members and 72 associate members; 447 hours have been flown dual, and 770 solo, which includes 26 "A" licences and one "B." Among the "A" licences were two lady members, Mrs. M. MacEwan and Miss S. Stagg. Mr. W. Garner obtained both "A" and "B" licences, and is now First Officer on the Egyptian route of Imperial Airways. Both Ipswich and Blue Barn were visited by Sir Alan Cobham in connection with National Aviation Day. Lectures on Navigation and Meteorology up to the standard of the "B" licence, and second-class Navigator's licence, are given at the club-house, Ipswich, by the instructor. Both Ipswich and Colchester aerodromes have fully-licensed club-houses, where bridge drives and other social events are held.

BRITISH GLIDING ASSOCIATION, LTD.

As a result of the plans discussed by the Council of the British Gliding Association, prospects for a British entry in the 1933 International Gliding Competition are now much brighter. The Council consider that the absence of a British team would be a definite loss to British prestige, when it is likely that Austria, Germany, France, Belgium, Greece, and Poland will be represented. This annual competition, which will be held at the Wasserkuppe, Germany, from August 13 to 20, is a strictly International Sporting and Scientific Meeting, and is the first to be organised by the International Commission for the Study of Motorless Flight.

SURREY AERO CLUB

FLYING activities at Gatwick have greatly increased in spite of the cold weather, and several new pupils have joined the Redwing School of Flying. Mr. T. G. Thomlinson from South Africa has successfully completed his "B" licence tests and is now engaged by the firm. On Friday evening a supper dance was held at which some 40 or 50 members danced until early morning.

YORKSHIRE AEROPLANE CLUB, N.F.S.

Heavy snow and continued cold weather have between them brought the flying time down to an unusually low figure. Several new members have joined, however, and on January 25 and 26 the Dominion Company entertained some of their local customers to flying trips in their own machines.

HULL AERO CLUB

The Hull Aero Club set out at the beginning of the year 1932 with two objects in view, one, to increase membership by stimulating interest among existing members and, two, to increase interest among the public of the city who are the owners of the aerodrome. To overcome the argument that the aerodrome is situated on the wrong side of Hull, the Club organised its own transport, members with cars giving lifts to those without, and it worked very well, with the result that lectures and the fortnightly dances were well attended. Two Club outings were held to the Blackburn works at Brough and to Tollerton.

To stimulate interest in flying a series of aviation days were held which were very successful; parties were invited from any firm or organised body in the city who were prepared to come; the numbers varied from a dozen to a couple of hundred. On one occasion a large firm used the aerodrome for their sports day, the visitors being entertained by members of the Club. Everyone went away satisfied and some 100 hr. flying was secured besides an increase in membership.

At the beginning of last year membership was about 180, of which 70 resigned, though at the present time there are about 230 flying and associate members. Flying times show a decrease on 1931, due probably to the difficulty of getting repairs done and to the depression which has affected Hull perhaps more than most places.

LEICESTERSHIRE AERO CLUB

THE Club's annual ball will not be held this year owing to economic conditions. The members' dance held at the Palais de Danse last December proved to be so popular that it has been decided to hold a similar function in place of the annual ball; it will again be held at the Palais de Danse, Humberstone Gate, Leicester; music will be provided by two bands, one of which will be the "Ritz Players."

LANCASHIRE AERO CLUB

THE Lancashire Aero Club held a most successful ball on Tuesday, January 24, at the Midland Hotel, Manchester. It was known locally as the "Flying Ball," and it was kept rolling up to the early hours of the morning. Before the dance a reception was held by Sir John and Lady Siddeley, a bouquet of red flowers being presented to Lady Siddeley. The music was provided by the Quinquaginta Band from Cambridge University; they not only looked very smart in their uniform but played extremely well, their time, or should one say rhythm, was excellent, superior in fact to a great many professional bands in the West End of London. Among those present were Sir Henry and Lady Fildes, Sir William Letts, Mr. and Mrs. Alan Goodfellow, Dr. and Mrs. Templeton, Lt. Bentley and Messrs. George Yuill, R. H. Dobson, R. Chadwicke, J. Mollison and William Courtenay.

CINQUE PORTS FLYING CLUB

The Club is now in full operation after the holidays, and there is great activity at Lympne. Two new pupils, Mrs. W. E. Davis and Mr. G. J. Geoghan, regular pupils who have returned for more instruction include Miss Staple-Smith and Messrs. Frence and Boucher, while Messrs. Searl, Ridley and Thompson have done solo flying. On Wednesday Mr. Shuttleworth arrived in his new Comper. The Lympne dinner and dance will be held on Friday, February 3.

MAIDSTONE AERO CLUB

During the month of December, which is usually a bad flying month, the hours totalled 46, which is good for a young club. The flying interest in Kent is surprising, and every week there are several new recruits; also, a considerable number of people are beginning to come out from London, which is only 29 miles distant. The "Strangers' Welcome," held on Sunday, January 29, resulted in several new members and was well attended. The Club is to be officially opened on June 17, full particulars of which will be issued later. On Sunday, February 5, at the monthly "At Home," the new Captain and Vice-Captain, Mr. C. H. Lowe-Wylde and Mr. M. Sassoon, will be welcomed. There is still one lock-up available at £2 10s. per month.

The following events have been arranged to take place during the year:—Saturday, June 17, official opening of Maidstone Airport and Aero Club; Saturday, July 8, Charity Air Display; Saturday, August 5, All-Women's Air Rally, and Saturday, September 9, Kent Air Pageant.

FOR THE COMING GENERATION: The College of Aeronautical Engineering is doing much good work, turning out trained Ground Engineers. This new hangar at Brooklands is where their students will be taught aircraft construction. (FLIGHT *Photo.*)

COTE HILL AERODROME

Owing to Mr. Lees having taken a much larger farm a few miles distant, the above aerodrome will be closed unless the incoming tenant will allow it to be still used as such. Mr. Lees is leaving on March 25, but is leaving behind a hangar for two, folded planes, a tail trolley and wheel chocks if the incoming tenant chooses to use them.

BENGAL FLYING CLUB

DURING the month of December Messrs. G. D. Mookerjea and S. C. Ghose passed tests for "A" licences, and the following members did cross-country flights: Mr. D. Keiller, with Mr. Grant as passenger, from Dum Dum to Dacca and return, and with Mr. Jaffer as passenger also from Dum Dum to Dacca and return; Mr. Biren Roy, with Mr. K. N. Choudhury as passenger to Maheshganj and return; Mr. D. J. Leckie, with Mr. Keiller as passenger, to Dacca and return; and Mr. A. H. Y. Ali flew from Silchar, Assam, for the opening of the new clubhouse, and returned two days later; he was flying a Comper "Swift." On December 28 a General Flying Competition was held, Mr. B. D. Mookerjea securing first place and Mr. B. K. Das second. In a Map-reading Competition Dr. H. Rahun and Mr. B. L. Lohia gained the honours. On the same day the new clubhouse was opened by Her Excellency the Countess of Willingdon. The ceremony consisted of the severing of ribbons, in the Club's colours, which encircled the clubhouse, with a pair of silver scissors, on which was impressed the Club's crest. The Hon. Mr. Justice Costello, the President, in welcoming Her Excellency, expressed regret that His Excellency the Viceroy was unable to attend. Lady Willingdon, in replying, expressed her pleasure at being present, and said that so air-minded was she that by air would she travel home in the middle of the year. She and her husband intended to present a trophy, which was to be competed for annually. An aerial display was then held, which consisted of formation flying, aerobatics by the Club Instructor, the bombing of a moving car, which caused great amusement, a height-guessing competition, and an exhibition of crazy flying by Mr. Raynham. Joy riding was in progress during the afternoon. Machines used were one "Puss Moth," one "Avro Avian," one Comper "Swift," three Club "Moths" and one private "Moth." The Club can boast 326 members, and the flying times for December were dual 13.25 hr. and solo 118.55 hr.

Correspondence

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

CHEAPER LIGHT AEROPLANES

[2825] Thirty years ago engineering firms said that there was "no money to be made out of motor-cars." A few years later the same remarks were made about motor-bicycles by cycle manufacturers. Consequently the price of motor-cars and motor-cycles remained high, and for some years the number of motorists small.

Nowadays, to judge from remarks made to me by men in the aircraft world, "there is no money in light aeroplanes."

Well, we certainly know that there are fewer privately-owned light aeroplanes than there ought to be, that there are not a great many aeroplane clubs, and, as your correspondent, Mr. Gotch, says in his letter of January 5, one has to pay over £600 to get a new machine.

Surely, however, there is some hope in the knowledge that the motor-car and motor-cycle industries *did* wake up and discover that, by some means or other, motor-cars and motor-bicycles could be made very much more cheaply than they originally conceived, by adopting methods that they had not previously thought about.

Most light aeroplanes, as was so well pointed out in Maj. Travers' recent paper, follow along the good old lines adopted during the war, and I suggest that these are not necessarily the ultimate lines. Your correspondent, for instance, mentions the motor-assisted gliders, or Planettes, and suggests that the drop from 100 h.p. down to 6 h.p. is a little unreasonable. From the fact that these Planettes, whatever their faults, do at least fly quite well, he deduces that a 30-h.p. aeroplane might be quite sound from every point of view. Nobody wants a ridiculously low landing speed, and the impecunious owner is prepared to forgo, if necessary, and for the time being, a pleasantly high maximum speed.

Whether Mr. Gotch is right or wrong I am in no position to say, but I do feel that somebody ought to support his arguments until they are proved to be unreasonable.

What of the German-built "tailless" aeroplanes, the "Stork" and the "Dreieck"? The former manages a maximum speed of 77 m.p.h. from a puny 8-h.p. engine, and the latter, a cabin-type two-seater, does 84 m.p.h. with the help of a 30-h.p. Bristol "Cherub III." Where has the Curtis-Wright pusher gone? This machine, produced early last year, was powered with a 40-h.p. engine and was curiously similar in general design to the machine shown by Maj. Travers.

Can we hope that some aircraft designer, with these examples before him, will consider the possibility of making aeroplanes on different and less expensive lines? Then the impecunious hundreds of "A"-licence pilots who take the air on club machines will come forward and prove that there is a market, despite the moanings of the wise-acres.

ERIC W. WALFORD.

Coventry and Warwickshire Aero Club.
January 11, 1933.

LATERAL CONTROL OF THICK-WING MONOPLANES

[2826] It would appear from an article published in your issue of January 26, page 77, that all thick-wing monoplanes are subject to grave trouble with their controls.

The fallacy of stating generalisations of this nature is proved by reference to such successful designs of thick-wing monoplanes as Fokker, Junkers and Klemm, the lateral control of each of these machines being very effective and satisfactorily light in operation.

Effective aileron control at speeds from the stall to that in excess of 200 m.p.h. is largely a matter not only of the correct proportion of aileron area to wing, especially as to chord, but also to the rate of taper in both plan and thickness. High efficiency wings of a gentle rate of taper in both these directions (*i.e.*, wings that do not make use of a very great depth at the root to enable them to use a lighter spar than otherwise would be possible) are quite satisfactory with the normal type of unbalanced aileron.

The "reversal of aileron control at high speed" referred to in the article can only be attributable to lack of torsional rigidity in the wing structure. Throughout the speed range from below the stall to exceeding 220 m.p.h., and throughout all manœuvres, both the aileron and elevator controls on the "Gull" are highly effective without heaviness—and this without resort to the use of flaps, balances or servo controls.

E. W. PERCIVAL.

London.
January 30, 1933.

Gold Medal for Autogyro Inventor

THE 1932 gold medal of the International Aeronautical Federation has been awarded to Señor Juan de la Cierva.

Glider Mail Stamps

THE Maribor Flying Club in Austria is to start a mail service by glider, and special stamps are being prepared. The club's president, who was taught gliding by Herr Kronfeld, will inaugurate the service, and it will be well backed up by the Government authorities.

Civil Service Exam.

AMONG the list of successful candidates who passed the Civil Service competitive examinations held last July and August, appears the name E. S. Jackson, from Corpus Christi, Oxford, who has been assigned to the Air Ministry.

Increasing the Speed Range

The Langley Memorial Aeronautical Laboratory has conducted flight tests on a parasol monoplane with and without an auxiliary aerofoil placed above and ahead of the main wing. The results show an increase in lift coefficient from 0·675 to 0·98, while the increase in minimum drag coefficient was only from 0·025 to 0·026.

PURSUING its programme of research aimed at greater safety in landing aircraft, the American National Advisory Committee for Aeronautics has been conducting experiments with a view to discovering ways of increasing the ratio k_L max./k_D min., or in other words the speed range. Special attention is being directed to devices having no moving parts. A series of tests made recently in the vertical wind tunnel showed that promising results could be obtained with a fixed auxiliary aerofoil mounted above and ahead of the main wing. These tests were followed by actual free flight tests made with a Fairchild F-22 parasol monoplane. This machine is an orthodox parasol monoplane, strut-braced, without taper in chord or thickness, but with wing tips semi-circular in plan form. The aerofoil section of the F-22 is known as N-22, and the wing has a span of 32 ft. 10 in. and a chord of 66 in. N.A.C.A. *Technical Note No. 440*, from which the accompanying graphs are reproduced, points out that it would have been more desirable to have tested the auxiliary aerofoil in conjunction with a wing of Clark Y section, but no suitable machine with a wing of that section was available, and the characteristics of the two aerofoils are, in any case, not very different.

The auxiliary aerofoil was of the same section as that used in the wind tunnel tests, and was located in what the wind tunnel tests indicated to be the optimum position. The dimensions of the auxiliary aerofoil are shown in Fig. 1 (we have retained the original numbering of the illustrations, although we reproduce but four.—ED.), and also its placing in relation to the main wing.

The auxiliary aerofoil was constructed of laminated spruce, and had a duralumin trailing edge. It was attached to the lower surface of the main wing by nine steel tubes, one at each internal drag strut. The total increase in weight due to the installation of the auxiliary aerofoil was approximately 130 lb. (It should be remembered that this was purely an aerodynamic experiment, and that there does not seem to be any good reason why in actual practical use an auxiliary aerofoil should weigh, with its supports, 5.2 lb. for each square foot of its area.—ED.) The machine fitted with the auxiliary aerofoil was

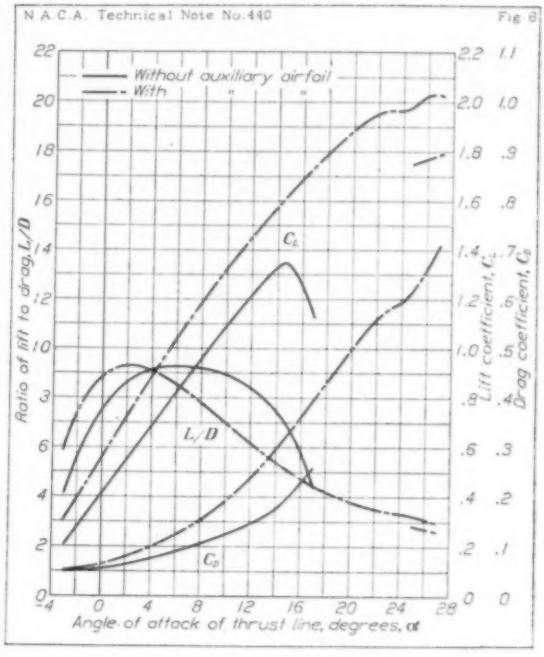


Fig. 6: Comparative curves of the aerodynamic characteristics, based on the main wing area only, of the Fairchild 22 with original wing and with auxiliary aerofoil fitted. Corrections have been made for propeller drag.

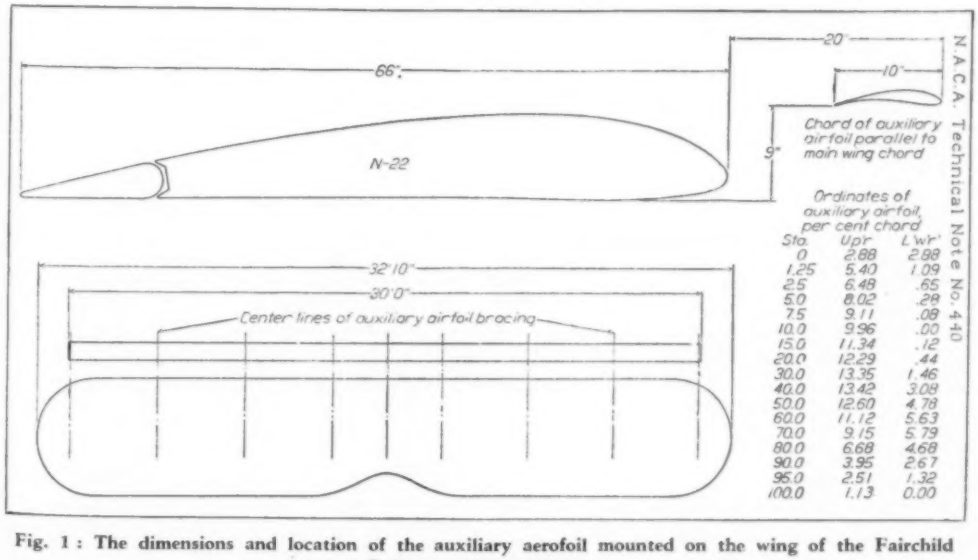


Fig. 1: The dimensions and location of the auxiliary aerofoil mounted on the wing of the Fairchild F.22 parasol monoplane.

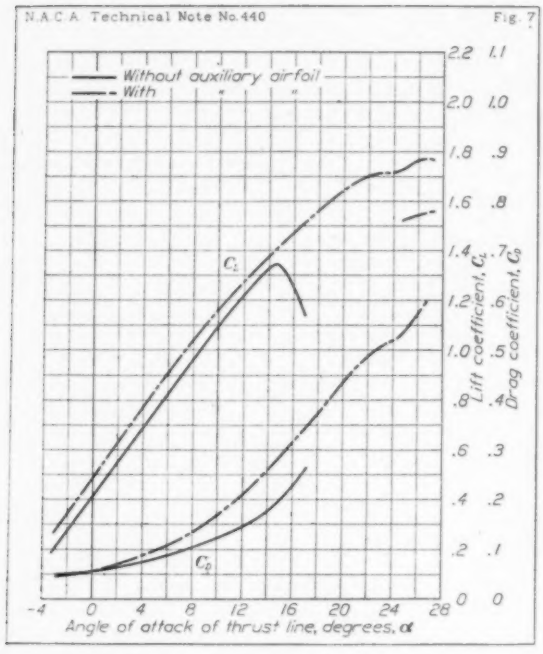


Fig. 7 : Comparative curves of the aerodynamic characteristics, based on actual area, of the Fairchild 22 without and with auxiliary aerofoil. Corrections have been made for propeller drag.

found, as had been expected, to have its centre of pressure farther forward than with the plain wing, and the weight of the auxiliary aerofoil reduced the amount which the centre of gravity had to be moved forward to restore balance. With the original machine satisfactory trim was found when the c.g. was at **30.9** per cent. of the wing chord. With the auxiliary aerofoil added the c.g. had to be shifted to **27.1** per cent. of the main wing chord to get satisfactory trim.

The aerodynamic characteristics of the aeroplane were ascertained by gliding with the airscrew stopped, measuring the angle of the flight path, the attitude of the aeroplane, and the dynamic pressure during the glide. During the glides the airscrew was always stopped in a vertical position. On completion of the flight tests, the drag of the airscrew was determined in the full-scale wind tunnel, and the necessary corrections made in plotting Figs. **6** and **7**.

The Report points out that a peculiarity of the lift curve is indicated in Fig. **6** by the two distinct lift curves above an angle of attack of **24** deg. This peculiarity was evidenced in flight during a steady glide by an abrupt change in the attitude of the aeroplane, after which there was no tendency to oscillate longitudinally, and the ensuing glide was as steady as that before the change. Because of this phenomenon it is considered unsafe to exceed the angle of **24** deg., particularly in landing.

From the curves on Fig. **9** it is interesting to note that the high drag at large angles of attack, although an advantage in increasing the gliding angle when landing, is a disadvantage at take-off, as it increases the power required. The actual take-off must be made at a lift coefficient of **1.75** (**0.875** British "absolute" units) instead of at **1.96** (**0.98** "abs."). Consequently the actual take-off speed is **3** m.p.h. greater than the potential take-off speed.

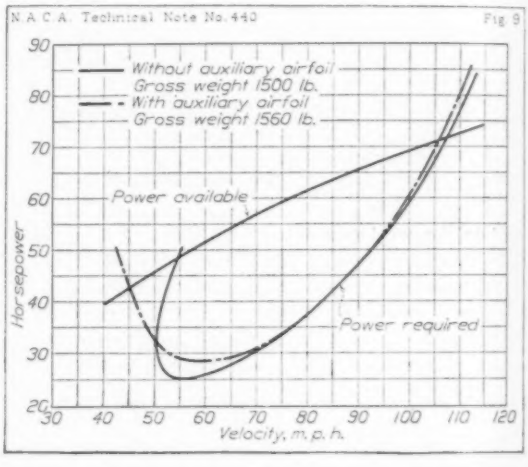


Fig. 9 : Performance curves for the Fairchild 22 with and without the auxiliary aerofoil.

Gull Developments

THE original Percival "Gull" has been considerably speeded up by the installation of the Napier **160**-h.p. **E.97** engine (described in FLIGHT for June **24**, **1932**). The machine is now flying at Heston, and is there credited with a cruising speed in the neighbourhood of **140** m.p.h. with a maximum of about **165** m.p.h. This combination should prove an excellent one for commercial operators and others who wish to complete their journeys as rapidly as possible and to do so in comfort. The first of a production batch of "Gulls" is now nearing completion at the works of George Parnall & Co., Ltd., Yate, and will, we understand, be fitted with a "Gipsy Major" engine and then delivered to Mr. Lindsay Everard at Ratcliffe aerodrome. The original "Hendy **302**," the ancestor of the "Gull," has now been purchased by Mr. C. S. Napier, who has been doing a considerable amount of flying on it at Croydon. He is also understood to have a "Gull" on order. The "**302**" has a "Hermes II" in it at present, but later, when making other modifications to the machine, like the addition of Palmer wheel brakes, a "Hermes IV" will be installed. His "Gull" will also have a "Hermes IV."

A Misguided Presentation

ONCE more the American film industry has very misguidedly made use of magnificent material. We refer to the film "Air Mail," now showing at the Dominion Theatre. Its obvious intention is to provide in a palatable form a boost for the work of the American Air Mail pilots, and few aircraft operators in the world deserve this more than they do. Possibly we misjudge the producer when we look upon the result of his work through English eyes and, maybe, the American populace will lap up his story with avidity. He has made the running of the air mail a gruesome and slaughterous business, for in the few days in which we follow its history we are treated to no less than four crashes with the loss of three pilots. The flying is, of course, excellently done, and the crashes almost too realistic—for English consumption we feel that the pilot's cries while being burned to death in the first crash could well have been omitted—but why on earth is the story of the pilot who took to his parachute and left two passengers to crash, raked up again? The equipment for night landing on American aerodromes would, if this film is a fair sample, appear to be far behind our own, as an occasional burning-oil barrel is hardly what we are led to believe is provided for an airport regularly used by night-landing aircraft. However, we do not for one moment suggest that people would be ill-advised to see this film, and, provided they go with the desire to be entertained, forgetting anything they know about flying they will probably not feel that their money has been wasted. At least they will have the pleasure of seeing that much-heard-of trick of flying through a hangar repeated several times, and, if this particular part is a fake, then it is certainly a very good one.

The Rohrbach "Paddle Plane"

By EDWIN P. A. HEINZE

STRICTLY speaking, the principle of operation involved in the working of the new Rohrbach machine, which is claimed to be capable of standing still and even flying backwards in the air, as well as rising and landing perpendicularly, is not similar to that of the well-known paddle wheels on river steamers still popular in many parts of the world. It is rather akin to that of the Voith-Schneider water propeller successfully employed, especially on the big passenger boats operated by the German Railway Company on Lake Constance.

The new Rohrbach machine as yet exists only on paper. But it has been carefully designed and calculated in every detail. The calculations have been checked by the Deutsche Versuchsanstalt für Luftfahrt, the official German approbation authority.

The machine has a fuselage of normal appearance and of light weight, light construction being possible owing to the structure not being called on to transmit so large steering stresses as in normal aeroplanes. Inside the fuselage, accessible during flight, are located two 130-h.p. Hirth or Argus inverted cylinder engines, the crankshafts of which are connected by a short shaft passing through a gearbox, from where drive is transmitted through a perpendicular shaft to a transverse shaft at about roof height. This latter shaft passes out left and right in a tubular casing tapering outwards, and is extended about 20 ft. right and left of the fuselage. On these outside shaft lengths are secured three radially disposed lines of struts. Each row of these carries on top a blade-like all-metal wing, which is pivoted on the struts down its centre line. Besides these supporting struts each blade is provided with a connecting rod gripping a journal inside it a short way forward of the centre line, while the lower end is apparently guided by cams on a sleeve surrounding the driving shaft rotating the system of three blades on each side of the machine. This sleeve with the cams can be regulated by the pilot, and it serves to incline the blades on their pivots so that during rotation of the whole system each blade continually changes its angle relative to the supporting struts, always in recurring positions, assuming the same angle as previously as long as the camshaft is not turned.

The arrangement is such that the engines work at constant speed, and in normal flight the blades successively coming up from behind, as they approach the zenith of their circular motion, assume the position and angle of incidence comparable with the air current of normal wings. The diameter of each rotating system as designed for this machine is 11½ ft., and as the speed of revolution, not divulged, but estimated from certain explanations, is at least 300 r.p.m., this top blade moves forward with a speed of approximately 125 m.p.h. As also the forward speed of the machine is expected to reach 125 m.p.h., each blade in the upper sector of the circle of motion, therefore, travels with 250 m.p.h. through the air and produces a powerful lifting force. Going farther forward and downward, the blade changes its angle and the lifting force is gradually divided into a propulsive and a lifting force, the latter decreasing as the former increases. At about 90 deg. from top position the blade exerts solely propulsive force. Going farther down, this blade resumes its position as in the top sector, but, of course, now lies on its back. But in this position it again engenders a lifting force, though this is of very small capacity owing to the blade travelling with the wind. On its sweep up at the rear the blade once more assumes an inclined position to reduce drag, while simultaneously once more beginning to create lifting force. There being three such blades, two of them are practically always in a position in which they produce more or less of a lifting force. By turning the cams the pilot can regulate blade movement to such an extent that no lift, lift and forward propulsion, lift and rearward propulsion or only lift can be produced. For the standstill position in mid-air the cams are probably so arranged that no alteration of the blade angles during the circular movement of the blades takes place. In this case the slight forward movement engendered by the blades going down in front would be balanced by the rearward movement induced by the blades going up at the rear. By these means Dr. Rohrbach expects to be able to carry out every desirable manœuvre in the air, to make the machine rise and land perpendicularly, to travel back or forward or to hover over one spot.

Should the engines fail in the air, the machine is expected to glide down in a similar fashion as an "Autogiro," owing to the blades being in this case driven by the wind. It is also possible for the pilot to balance lateral swaying of the machine in the same manner as with ailerons, and to describe curves by banking the machine, which can be effected by slightly advancing or retarding the lifting force of the rotary systems on the one or other side of the machine, it being possible to control the blades of the two systems separately.

The cabin of the machine has four seats. That of the pilot is located in the nose of the machine, right in the centre, so the pilot has excellent view on all sides. The other three seats are arranged one behind the other on top of the engines, being accessible by a gangway running beside the engines on the right side. Also the passengers have very good view because the rotating blades offer no great obstruction.

The whole machine is claimed to be cheaper to produce than normal machines of similar capacity and size, owing to the lightness of the fuselage and the many identical parts used in the construction of the "paddles." Also the undercarriage can be of less weight because it is not called on to withstand the shocks of fast landings. The centre of gravity is sufficiently low to prevent unpleasant torque reactions, yet not so low as to cause the machine to pendulate.

Some Comments

The idea of obtaining propulsion as well as lift from an arrangement of paddles of aerofoil section is not, of course, new, and was suggested, and models built and exhibited, by some of the earliest experimenters. What Dr. Rohrbach has, apparently, done is to design a machine employing this principle, taking every possible advantage of modern aerodynamic knowledge. We are frankly somewhat sceptical of immediate success, in spite of Herr Heinze's assurance that the Rohrbach calculations have been checked by the D.V.L. The more one studies the subject the more difficulties does one encounter.

Aerodynamically the paddle principle is not very difficult to follow. The paddles change their angle on the way around the circle in such a way that the resultant of the forces upon them is inclined forward and upward for forward flight, straight upward for "hovering" and, if desired, upward and rearward for flying backwards.

It would seem that in order to avoid too great changes in the angles assumed by the paddles, the circumferential speed ought to be fairly high in relation to the speed of the machine. In the case of the "Autogiro," Mr. de la Cierva has laid down a ratio of 1.5 between tip speed and top speed. Our Berlin correspondent indicates that the Rohrbach "paddle plane" has the circumferential speed of the paddles approximately equal to the top speed.

Without a thorough study of the subject it is difficult to criticise a design so different from the orthodox aeroplane, but on the face of it one would expect that the equivalent of centre of pressure movement might be large for various conditions of flight, as the resultant changes its angle from forward slope to vertical, or even rearward slope. When the engine stops, and it becomes necessary to glide, one imagines that the "paddle plane" will share with the helicopter the necessity to alter the angles of the blades to ensure autorotation, which would introduce yet another control complication for the pilot.

Our correspondent appears to be slightly wrong in assuming that for "hovering" the paddles would all be at the same angle. If they were, the paddle travelling upwards would exert a negative lift, and the result would be that the machine would descend at a fairly high rate.

Mechanically the scheme seems to bristle with difficulties. To begin with, the axle or spindle of the paddle system must of necessity be a cantilever beam, around which rotate the struts which carry the paddles. Then there is the complication of the cam gear, which will probably be considerable, and which, even if the difficulties are solved satisfactorily, may be rather noisy.—ED.

Air Transport

THE GROWTH OF IMPERIAL AIRWAYS

THE passenger traffic on the Imperial Airways' Continental routes during 1932 has shown a steady growth over and above the figures for the previous year. For example, the number of passengers carried during the last three months of 1932 was 8,387 as compared with 3,873 in 1931. During the past year approximately 75,000 passengers travelled by air to and from Croydon and of this figure 41,300 were passengers in Imperial Airways' machines, while during 1931 the totals were 45,000 and 28,644 respectively. As was to be expected, the African route proved a success as soon as it was opened, and all accommodation has been booked on this service for the next two months.

Imperial Airways was first constituted as such eight years ago, and during its first year their 15 aircraft flew a total distance of 850,000 miles. Last year their fleet, which had by then grown to 40 machines, flew just on two million miles. Their routes are now approximately 14,000 miles in length and somewhere in the neighbourhood of 6,000 miles a day are flown. The carriage of mails, a matter of the greatest importance to the Empire, has shown an equally great increase. During the year 1925, for example, 200,000 letters were carried, while during 1932, 6,300,000 was the total.

In April of last year the final section of the African route from Kisumu to Cape Town was opened, and it is hoped that the Indian route will be extended from Karachi to Singapore in the near future.

Imperial Airways have maintained regularity and efficiency in a manner which has caused the admiration of operators throughout the world, and this is shown by the fact that the services cancelled on account of weather and for other reasons amounted to only 2.89 per cent. of the scheduled services during the year ending March, 1932, while the figure for the previous year was 5.32 per cent. On the African route 99 per cent. regularity has been maintained in the northern section and 100 per cent. regularity in the southern portion, and when considering these figures it is worth while remembering that the pilots on that route have to contend with tropical and frequently violent weather conditions.

One of the most difficult matters which the company have had to contend with on this route has been adequate drainage of the aerodromes, and experiments recently conducted at Malakal in the Sudan would seem to point to the fact that a solution has been discovered. The soil there, known as black cotton soil, becomes exceedingly sticky and boglike during and immediately after heavy rain, while it dries with very large cracks which also give dangerous conditions. The experiments have consisted of mixing the top layer of this soil with asphalt, which results in a substance capable of being rolled out smooth after it has been cut up by a tail skid, but which at the same time is sufficiently plastic to stand the weight of large aircraft while remaining waterproof.

During the year £50,000 was allotted to Imperial Airways under the provision of the Beit Trust Grant. This sum is being used to provide new landing grounds, improvement of existing aerodromes, development of wireless and telephone facilities and the establishment of meteorological stations.

With regard to the machines comprising Imperial Airways' fleet, the most interesting addition during 1932 is that of the Armstrong Whitworth "Atalanta" type monoplanes (described in FLIGHT for July 8 and 15) with four Armstrong-Siddeley "Double Mongoose" engines. These aircraft have a cruising speed of over 120 m.p.h. and by their use it is hoped to reduce the time taken on the African route from eleven to nine days. The first of these machines was recently flown out to Africa.

THE AEROPLANE PASSENGER

Air travel is now well established to meet and consider definite criticism, whether adverse or in praise

By W. G. RAFFÉ

WHERE pre-war flying was mainly experimental, and war-time flying entirely military or naval, post-war flying has gained most public attention and support by means of its passenger, mails and goods transportation services. One ordinary lay passenger converted as an enthusiast to flying is worth a whole regiment of generals asking for more military planes. His publicity is professionally unbiassed, his experience is paid for, and his satisfaction is entirely sincere. Therefore his testimony is to be sought and his patronage secured. As with other forms of commerce, "not the first sales but repeat orders" are the ultimate criterion of successful merchandising. Selling air transport is succeeding by its proven power to satisfy the ordinary man. And the ordinary woman and even the child!

Therefore air travel, with its routine services, must be prepared to meet criticism and justify its claims in comparison with every other mode of transportation, as well as taking due praise for its outstanding excellences.

Despite its unrivalled opportunity for appearing literally in the public eye, air travel still obtains insufficient publicity on behalf of its every-day services. We need no reminder that every accident immediately attains notorious dimensions in the daily press. The single fatal accident is allowed space out of all proportion to the million miles of normal air travel. Perhaps it is the fate of each new mode as it pioneers its way through experiment, opposition, and lack of interest, to attract Argus-eyed critics to its occasional human faults and mechanical failures; while they ignore all the every-day performance and again give notice only to its most sensational record-breaking achievements. While one is not ungrateful for newspaper publicity accorded to our friends who create new records, one feels that a little more attention to their daily work would perhaps be more immediately helpful. But it is ever the desire of newspapers to present sensation. And the normal routine of air travel is admittedly no more a thing of sensation—except to the new passenger. It is a basic essential in selling air travel that more and more new buyers must be obtained. Having been secured, at some cost in advertising, they have to be retained. Their goodwill must be firmly established; and that can be done only by a flawless service.

Air travel and freight transport are not yet so simple that all the benefits are easily apparent. The speed factor, unrivalled by other modes of travel, is seriously injured by occasional failures in auxiliary transport. The present design of aeroplanes usually implies an aerodrome at some distance from the centre of town or city. Available spaces in the city centres are very few. Train or motor transport becomes quite essential. *And with this auxiliary service, unvarying promptness and speed are absolutely necessary to provide and round off the full advantage of speed in the aeroplane itself.* Of what use is it to travel a hundred or more miles within one hour, if the next half-hour is wasted through avoidable delays in idling about in the aerodrome offices waiting for transport to the town centre, which is, after all, the destination of the normal traveller?

Examples could be multiplied, from experience through Europe, of irritating delays in town-to-airport (or reverse) transit. This is apart from all extraneous questions such as Customs and passport examinations, which are outside the control of the air companies. In London the facilities are usually good. In fact, access to Croydon is more troublesome for the non-traveller than the booked passenger who travels comfortably down from the Airport Terminus at Victoria. The lack of communication between Waddon and the Airport is a nuisance. No regular trams or buses appear to run, while a taxi is unobtainable close at hand. Private cars will solve the problem—as anywhere

else! But private cars are not always to be got either. *Passenger aeroplanes must be adequately served with passenger cars.*

Curiously enough, even the Tempelhof Aerodrome suffers in a similar way. Much nearer to the centre of Berlin, it is served partly by Underground railway and partly by surface street car, for the last kilometre. The Flughafen Underground station is that distance away; and when the street-car service has stopped, no alternative transport remains. Again, taxis are infrequently found free at that point; and when leaving at night, by the Derulluft Berlin-Königsberg-Moscow service, this omission is glaring, for no *autobringerdienst* is provided—passengers must in all instances make their own way to Berlin's aerodrome. Obviously, there should be a car service, at least to Hallesche Tor, to pick up or set down passengers. It is no longer safe to assume that only car-owning plutocrats will patronise air services; anyhow, the supply of millionaires is steadily decreasing, and quite ordinary persons must be considered nowadays!

In smaller towns and smaller aerodromes similar questions arise with even greater force, possibly because aerodrome staffs also are smaller, possibly because they are more languid. In some instances passengers arriving by one plane are delayed until the arrival of a second machine, maybe half-an-hour or more later, just so that the two lots may travel to town in one autobus. This petty economy is allowed to suggest to the first arrivals that their expensively purchased time is really of less account than they had imagined. This notion is further enforced by the absurd conditions of insurance now current, under which lost time is not covered.

The arrangements found in the capital city of Yugoslavia, in its aerodrome at Zemoun, must seriously damage the prospects of air travel to Belgrade. The city is situated on the confluence of the Sava River with the Danube, making a T-shaped division of land. Zemoun is on one side and Belgrade on the other side of the Sava. There is only one bridge, for the railroad, and that is much higher up the Sava. A road bridge is in process of construction, with so-called Indemnity Funds; it is unlikely to be complete for several years, but unfortunately the aerodrome transport service is organised as if it were finished. The traveller is taken by auto, not to Belgrade city, but only to the Zemoun quayside. There he is left, without a guide and without transport, to find his way to Belgrade as best he can, as in the good old mediæval days of pilgrimage. He may solve the problem by picking up a riverside porter to cart his baggage to the ferry steamer, to accompany him and to take tickets, and to put his traps on a tram or taxi at the Belgrade quayside (paying the porter when exchange has been got), but his opinion of the air companies' organisation will scarcely be improved by all this unexpected trouble. Especially as the provision of a small motor-boat and another car in Belgrade would avoid this ever-recurring trouble to reach the centre of the city. Of course, when one *is* familiar with the city and its cheap ferry (it is only three dinars, about three-pence, from Zemoun to Belgrade), the 20-minute journey is quite simple. But the fact remains that the air traveller never *does* know, when he first tries aerial transport, all the routes from centre to airport. And he judges organisation more by failures than by the occasions when transport is there, for he expects to find it in the ordinary way of business.

(To be concluded.)

Rand Durban Air Mail.

A DIRECT air mail service between Durban and Johannesburg (Rand airport) was inaugurated on January 2. The service will be thrice weekly in each direction, the time-table being as follows:—Leave Durban 10 a.m. Monday, Wednesday and Friday. Arrive Rand airport 2 p.m. Monday, Wednesday and Friday. Leave Rand airport 10 a.m. Tuesday, Thursday and Saturday. Arrive Durban 2 p.m. Tuesday, Thursday and Saturday. For the present, letters and postcards only will be carried in the mails to be conveyed by this service. The existing inland combined postage and air fees, namely, 4d. per ½ oz. for letters and 2d. for each postcard, will apply.

Dutch Indies' Air Services in 1932

WE have received from K.N.I.L.M. (Royal Netherlands Indian Airways) the following interesting figures regarding the air services operated by this company (a branch of K.L.M.) in the Dutch East Indies during 1932. The total number of passengers carried on the regular services came to 10,797, and on joyrides and special flights, 7,927. Freight carried was 144,701 lb.; mails, 40,755 lb.; and parcels (six months), 1,951 lb. During the same period 2,935 flights were made in 5,279 hr., covering a distance of 536,475 miles. Since these services were started on November 1, 1928, up to January 1, 1933, 1,956,500 miles have been flown. We understand that the inhabitants of the Straits Settlements and Federated Malay States are showing considerable interest in the K.L.M. weekly service between Holland and the Dutch East Indies. In December last 691 lb. of air mail was despatched by the K.L.M. aeroplanes from Alor Star (near Penang), which is nearly three times as much as in the same month of 1931, when the K.L.M. air service was also on a weekly basis.

"The Amsterdam-Batavia Weekly Service"

TO-DAY, February 2, Mr. A. Plesman, Managing Director of the Royal Dutch Air Lines (K.L.M.), will lecture before the Royal Aeronautical Society on "The Amsterdam-Batavia Weekly Service." The regular air service between Amsterdam and Batavia has been in existence for over two years. It is one of the most remarkable of the long-distance air lines and Mr. Plesman's lecture is one of the most interesting lectures ever read before the Society. Mr. Plesman deals very thoroughly with the difficulties of the route, its organisation, and its gradual building up from the first experimental flight to survey the possibilities of the route as long ago as October 1, 1924, by Van der Hoop. In his lecture Mr. Plesman explains why the particular route was chosen, the technical reasons, why certain machines were chosen in preference to others, the system of flying which is used, the technical difficulties encountered and how they have been met, the navigation of the route, choice of personnel, maps and meteorology, aerodromes and ground organisation, the results achieved, goods and passengers and mail carried and costs, etc. The lecture is, indeed, a very thorough survey of the organisation of a long air route from its inception to regular operation. The lecture, which will be illustrated, will be delivered at the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m.

Air Mail Traffic

THE weight of letters sent by air from this country during 1932 exceeded all previous records, and amounted to 64 tons as compared with 52½ tons in 1931—an increase of 20 per cent. The Christmas mail despatched to India by air during December amounted to about 3 tons; the mail of December 10 alone weighed over a ton and was the largest figure recorded for a single flight from this country.

Details of the letter air mail traffic are:—

	1931 lb.	1932 lb.
Indian Air Service	52,500	60,000
African Air Service	5,500	15,900
Other Imperial Services	15,900	14,300
Foreign Extra European Services ..	7,350	10,100
Continental Services	36,100	42,700
	117,350	143,000

Parcel air mails were affected by the general trade depression and amounted to 57 tons as compared with 62½ tons in 1931, but in spite of this drop the total weight of all mails sent by air from Great Britain rose from 115 tons in 1931 to 121 tons in 1932.

New French Air Route

M. J. R. MAHEU is about to investigate the possibilities of an air line connecting Algiers with Fort Lamy on the Shore River to the south of Lake Chad. A motor road may also be constructed to follow the air route. Then the air route will probably follow the motor road, as has happened on the route Amman-Baghdad.

Manchester Air Lines

MANCHESTER CORPORATION have realised that it is only a matter of time before England is linked up by air to Ireland, in which case Manchester would probably be the jumping-off point from English soil. Manchester has decided that if air lines to Ireland are to be established then the city ought to benefit by running the service themselves. Meanwhile Mr. Hillman has been busy, and was to have flown up to Manchester in one of his new D.H. "Dragons" last Friday, to discuss the matter with the authorities, but was unfortunately prevented from so doing. No doubt the Manchester Corporation would be interested in the new three-seater commercial machine which A. V. Roe & Co. are producing later in the year.

Airport News

THE GROWTH OF HESTON

AIRWORK, LTD., have always been known for their go-ahead policy ever since they started work at Heston Airport. It is not surprising therefore to find that the amount of flying done and the business handled generally at Heston has increased considerably during 1932 despite the general depression. Flying hours at the school, it is true, show a reduction on the previous year, but despite this the number of pilots gaining their "A" licence was increased to 48. The number of private owners housing their machines at the aerodrome has risen considerably, while the number of Customs clearances during the year increased to 993. Heston has become the starting point for many excursions abroad as, owing to the facilities provided there, it is unnecessary to clear Customs at Lympne, thus avoiding an unwanted break in the journey. The aerodrome has also been the starting or finishing point for many races during the year, including the *Morning Post* Race in May and the London-Cardiff Race in October.

Several flying meetings and displays were held there, and an event of importance was a display which celebrated the handing over of a Borough Charter to Heston and Isleworth at the beginning of October. This was doubly important, as it is the first time that the coat-of-arms of a borough has included a pair of wings representing the borough's interest in flying. During the year three new companies, namely, Airwork Engine Service, Ltd., the British Air Navigation Co., Ltd., and Birkett Air Service, Ltd., started operations at the aerodrome. Facilities on the social side were increased by the addition of a hotel attached to the club-house and the bedrooms provided have been booked almost continuously since the opening. In order to improve the night landing facilities a 10-kilowatt "Chance-Airwork" floodlight has been erected, this being the first floodlight in this country to incorporate the "Shadow Bar" device for eliminating dazzle. The Automobile Association have arranged for the hire of flying maps at Heston and also from Misr. Airwork, S.A.E., their associated company at Cairo, while the Association's broadcasting station has issued their hourly weather reports regularly. The amount of work which has been through the Airwork Service Department, and also their branch department at Bristol, has increased considerably. Abroad not only has the associated company at Cairo been successfully started, but Mr. Alan Muntz, a director of the company, has been so successful in his negotiations with the Iraqi Government that it is hoped the company will be able to start operations in that country early this year.

Weekly Notes

On Monday, January 23, the cold weather and mist resulted in few private owners taking the air, but Mr. G. Baillie made a cross-country flight in his "Moth," G-EBYH. Possibly the fact that his machine is fitted with a wireless receiving set, enabling him to receive weather broadcasts from the A.A. weather bureau at Heston, gives him confidence to fly in thicker weather than most pilots like to set out in.

On Tuesday, January 24, Banco's "Puss Moth" journeyed to Dublin for the purpose of bringing back pictures of election incidents. Remarkably quick times were made both on the outward and return journeys.

Capt. Ferguson left in one of Airwork School of Flying machines for Spalding, with a cinematograph operator, to obtain films of the skating on the Fens. On Thursday, January 26, Flt. Lt. Bonham Carter, R.A.F., arrived from Andover in an "Atlas" with one passenger. Later he left for Hatfield.

Mr. A. B. Gibbons left for Paris, *en route* for Switzerland in his Klemm ("Pobjoy") with one passenger.

Mr. C. O. Powis, of Phillips & Powis, Reading, left for Rotterdam in "Moth" G-AAGT.

Mr. P. Wills left on Friday, January 27, in a "Fox Moth" for Paris with two passengers, *en route* for Switzerland, for the winter sports. The passengers looked very comfortable in the cabin, surrounded by their sports gear.

Heston took on quite a military appearance when Mr. Anthony Norman, of the Oxford University Auxiliary Squadron, landed in an "Atlas," followed soon after by F/O. Edwardes in a "Bulldog" from Upavon and then a Bristol "Fighter."

Banco had a charter to Gravesend and Southend with one passenger, and another to the Isle of Wight with two passengers.

On Saturday afternoon, January 28, Banco had two machines out—one to Plymouth to collect pictures for the press and one to Birmingham and the Midlands with a photographer for aerial views of skaters.

Flt. Lt. Christopher Clarkson has returned from his trip to Switzerland, where he has been indulging in winter sports. Unfortunately, he injured his knee, which forced him to cancel his holiday.

Forthcoming Flying Meetings and Contests.

THE following Flying Meetings and Contests have been fixed for 1933:—

May 16-22.—International Rally at Vienna, Austria.

May 25.—Rally of Tourist Planes at Wiesbaden, Germany.

May 28.—Deutsch de la Meurthe Cup, France.

June 11.—International Meeting at Brussels.

June 15-18.—Tourist Plane Meeting, Aero Club of France.

July 15.—International Rally at Dieppe.

July 22-24.—International Rally on the Belgian Coast.

September.—International Congress and Glider Meeting at la Banne d'Ordanche (Clermont Ferrand).

December.—International Rally at Cairo and Meeting of the Federation Aeronautique International.

Airwork's Interest in Iraq

EARLY this month Capt. T. N. Stack will leave with Capt. D. Cummings for Baghdad to represent the interests of Airwork in that country. Mr. Alan Muntz has so successfully carried through negotiations with the Iraqi Government that Airwork, Ltd., will, it is hoped, be able to form a local company much on the same lines as they have done in Cairo. Capt. Stack will be taking a new edition of the Spartan "Cruiser" specially fitted for work in that country. The pilot's cockpit, seating two persons, has been separated from the passengers' compartment, and the latter will now be entered via a door in the side of the fuselage, thus obviating the previous difficulty of climbing up the wing root. Luxurious seating has been provided for four passengers and the fuel tankage has been increased to give a range of 6-8 hr. according to the load carried. This "Cruiser" will be powered with three "Hermes IV" engines, and it will, of course, be possible to climb comfortably with full load on any two of them. For the start the fleet at Baghdad will consist of this "Cruiser" and a Spartan three-seater ("Hermes IV"). This latter machine has already left for Cairo, where it will be exhibited for three weeks from February 10 on the Misr Airwork stand of the Automobile and Aviation Exhibition being held there. On this stand the exhibits will also include models of the General Aircraft Co.'s "Monospar," models of some of the de Havilland products and other similar items of aeronautical interest. The work in Iraq will, of course, to a large extent depend upon the demand. It is hoped, however, to establish local services as well as provide charter and instructional work, and the fleet of aircraft will be added to as necessary. This would seem a chance for the Anglo-Persian Oil Co. to hire aircraft as and when wanted instead of going to the expense of maintaining their own. Baghdad is an excellent centre and it is to be hoped that the result of this British enterprise will be the establishment of air lines to the capitals of neighbouring countries.

Airisms from the Four Winds

Lady Bailey

LADY BAILEY, who, as already reported in FLIGHT, recently made an unsuccessful attempt on the England-Cape record, started on her return flight to England on January 20, when she flew from Tahoua (where she was forced down on the outward journey) to Niamey. On January 21 she flew to Gao, and thence to Adrar, about 560 miles from Oran. It was not until January 24 that she was able to reach Oran, and here she was held up by bad weather until January 26, when she crossed the Mediterranean to San Xavier, near Cartagena, where she was forced to land owing to slight engine trouble. Next day Lady Bailey continued her journey, but was forced down by bad weather once more at Alicante, where she was held up until January 29. Proceeding on this date, she was again forced down at Lezignan, whence she flew to Bordeaux and Angoulême on January 30.

Air Aid for an Admiral

WHEN Rear-Admiral F. L. Tottenham, commanding the Third Cruiser Squadron, required an immediate operation for ear trouble, two Italian surgeons were requested to proceed to Malta. In spite of stormy weather, three Royal Air Force machines were sent to Syracuse, where they picked up the surgeons and conveyed them to Malta. Rear-Admiral Tottenham underwent the operation and is going on as well as can be expected.

New Source for the Nile

DR. NOEL HUMPHREYS, at a lecture to the Royal Geographical Society, described his four expeditions last year exploring the borders of Belgian Congo and Uganda. Air co-operation has disclosed the fact that the River Nile has been wrongly mapped, in fact, it appears doubtful now whether the Nile has its source within the British Empire. It was found during the expedition that the River Ruamuli, flowing north from the ridges surrounding Lake Edward, started from a spring flowing out of a cavern which is now supposed to be the river's source.

Luxury Flying Boat Down

THE "Windward III" flying boat, owned by Mrs. J. J. James, of Kenya Park, Southampton, force landed in the sea off Positano on the Italian coast, during the afternoon of Wednesday, January 25. A trawler rescued the passengers and crew. The flying boat, with one broken wing, was later towed to the coast.

Young Norwegian Pilots Missing

No news has been received of the two young Norwegian pilots, Lt. Sigurd Aagnes and Mr. Wilhelm Omsted, who left Heston airport early Saturday morning bound for Oslo. As the visibility was bad they were advised to take the Lympne-Calais coastal route, but declared their intention of flying across the North Sea.

"Outboard" Safety

THAT Mr. Lowe-Wylde's very light aircraft are virtually "dinghies with outboard motors" no one can deny. That there is undoubted safety in the arrangement is proved by the crash which recently took place at Hanworth Park. One of these little machines was being flown by a pilot who perhaps credited it with a little more performance than it had, with the result that when in a vertical bank at about 50 ft. from the ground he found himself unable to level up the machine. A crash ensued which "wiped-off" the aircraft completely without damaging the pilot at all. The even more important thing, however, from the point of view of fire, was that due to its position neither the engine and propeller nor the petrol tank were damaged; a comforting thought for a nervous pilot.

A Canadian Pioneer

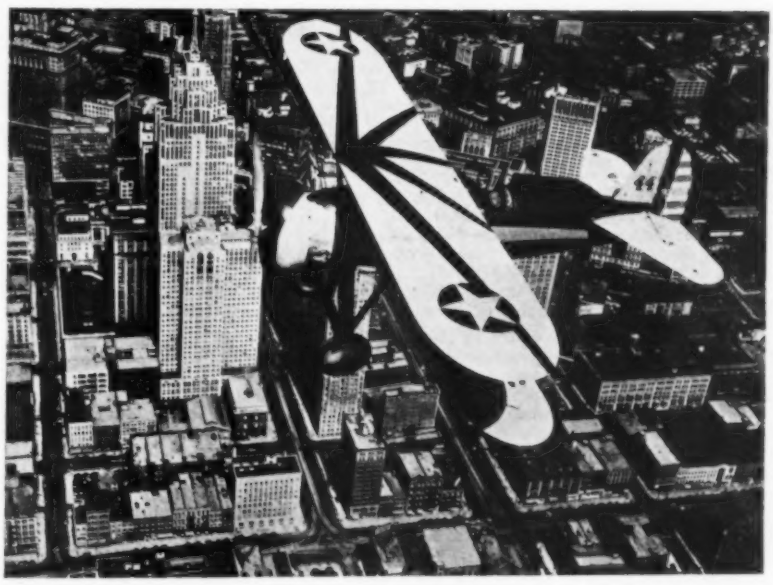
THE early history of aviation in Canada has lately been recalled by pilgrimages to the grave of Dr. Alexander Bell at Baddeck, a small town in Cape Breton, Nova Scotia, where 25 years ago there took place some of the first public flights in North America of heavier-than-air machines. In March, 1907, Mr. F. W. Baldwin flew a machine, powered by a petrol engine, and built in conjunction with Dr. Graham Bell, Mr. Glenn Curtis and others. This aeroplane was named the "Red Bird," and flew for 319 ft. at heights up to 20 ft.; on its second flight it crashed, so a second one was built, called the "White Bird," which made a world's record flight of 339 yd. Dr. Bell also built a glider which, piloted by the late Lt. Selfridge, rose to a considerable height. Dr. Bell also made a prophesy, which was remarkable for those times; he forecasted a machine which would be capable of 200 m.p.h.—well, that speed has been doubled, and in only 25 years.

Those Dangerous Pylons!

THERE is a probability of pylons carrying electricity cables being erected so as to cause a danger to aircraft operating from Haldon Aerodrome, near Teignmouth. A *Western Morning News* report states that the South Devon Regional Planning Committee has received a communication from the Air Ministry which mentioned that the Electricity Commissioners would not be prepared to divert the cables unless the cost was borne by the proprietors of Haldon Aerodrome. It has been decided to consider the question of cost carefully and to approach the Air Ministry again.

Imperial Airways, Ltd., and Sir John M. Salmond

THE Air Ministry announces:—The Marquess of Londonderry, Secretary of State for Air, has appointed Marshal of the Royal Air Force Sir John M. Salmond, G.C.B., C.M.G., C.V.O., D.S.O., to be one of the Government Directors on the Board of Imperial Airways as from April 1 next, in place of Air Vice-Marshal Sir Vyell Vyvyan, K.C.B., D.S.O., who retires on March 31 after seven years' service as Government Director.



MAKING SKYSCRAPERS LOOK SMALL: Seeming to be poised in the air, a single-seater, "Wasp"-powered Boeing P-12E pursuit plane, caught by the camera high above Detroit's business section. The plane's insignia is that of the 27th Pursuit Squadron, Selfridge Field, Mich. The Boeing Airplane Company of Seattle, Wash., completed an order of 135 planes of this type for the Army Air Corps early last year.

THE PAST YEAR AT BRISTOL

CONSIDERABLE progress has been made at the Bristol Aeroplane Works during the past year. In the Engine Department both the Bristol "Mercury" and "Pegasus" engines have been placed in full production, and the demand for these types has been so great as to require a programme of extension which, at the close of the year, was still in operation. The "Pegasus," described in FLIGHT for March 4 and 11, 1932, has, since its inception, already achieved world-wide recognition as an air-cooled engine of unusual merit. The attainment of the World's Altitude Record of 43,976 ft. by Flt. Lt. C. F. Uwins last September showed that the engine is perfectly suitable for operation under the most difficult circumstances. At the present time it has been found necessary to institute a night shift at the works in order to cope with the demand for these engines, and the organisation is extended to its fullest capacity. A department which is perhaps more fully developed at Bristol than is usually the case, is the Experimental and Research Department. Importance of this department cannot be over-estimated, and it is no doubt due to the activities which have consistently gone on there that both the "Pegasus" and "Mercury" show such a great advance over the previous Bristol engines.

In the Aircraft Department of the company a vast amount of research work has been carried out during the year in high tensile steel aircraft structures, particularly in connection with the use of stainless steel. Much experimental work has also been done in connection with the metal covering of aircraft structures. The Bristol "Bulldog" wing exhibited at the Paris Aero Exhibition in November was a good example of Bristol methods. Work has continued on the Bristol "Bulldog," and this machine is now in service in nine different countries. Among the developments of the 1933 type of this machine are the fitting of the "Mercury" engine with a Townend ring cowling, wheel fairings, and a change of wing section. These have together combined to produce a remarkable increase in performance. This machine, however, is not yet placed on the open list and no performance figures can therefore be given.

Another department at Bristol which has continued to serve aviation in a most efficient manner is the Flying School, and it is perhaps unique in the fact that during 1932 no damage of any kind whatsoever was done to a single aircraft used in the school, despite the fact that 170 officers of the R.A.F. Reserve underwent their annual flying training in this establishment, during which the flying time totalled nearly 3,500 hr. That this efficiency is appreciated by the Air Ministry is shown by the fact that the contract for reserve training has been renewed for the further period of four years. This contract will include, as in previous years, the training of *ab initio* pupils, as well as "refresher" courses.

SHELL-MEX NEW OFFICE

SHELL-MEX House, the wonderful new office of Shell-Mex & B.P., Ltd., was formally opened by Mr. Walter Runciman, the President of the Board of Trade, on January 25. Lord Bearsted presided at the luncheon which followed the ceremony, and said that he looked upon the completion of the new building as a symbol of the confidence of the Directors in the emergence of British industry from its present struggles.

Mr. Runciman, who gave the toast of "Shell-Mex House," said that this country had been in the forefront of all great developments in industry for the last 120 years, and he did not believe that we had yet come to the end of our resources. He warned his listeners that they should not look for new developments in the commercial world beginning in Downing Street. He said that the Government did all in its power to maintain industry on a stable and solid foundation, but it was the burden of commercial gentlemen themselves to assure the salvation of our country. On Thursday, January 26, the building was thrown open for inspection by a very large number of guests of the company.

This amazing structure was illustrated in FLIGHT for January 12, and even from that view it can be seen that it is something very unusual in offices. One of the first points which strike one on entering is the decorativeness and effectiveness of the wall linings of the staircase and lift halls. Such places have usually been lined with marble, but it has now been found possible effectively to polish stone from a shelly seam which runs through the main seam of Portland stone. This particular seam has hitherto been discarded owing to its bad weathering properties, which is the result of the large amount of shell and fossil remains found in it. It is these fossils, however, which make the stone valuable for interior decoration, and when polished give it a very pleasing effect.

Another feature of this building is the rapidity with which it has been erected. The foundation work was not started until March 1, 1931, so that the whole has been completely erected and furnished in less than two years. In its general lay-out it is very compact indeed, for centralisation is the keynote of the entire scheme. Particular attention has been paid to the circulation of pure, washed, and warm air, and each of the fifteen floors have their air changed regularly. The lifts, of which there are eighteen, are worthy of special attention. They travel at 500 ft. a minute, that is approximately one floor per second, nevertheless so efficient is the relay system which deals both with the acceleration and starting and the deceleration when stopping, that no shock at all is felt, and it is possible to bring each of these eleven-ton lifts to a standstill from its maximum speed in 10 ft.

The massive clock which surmounts the structure has already been described in FLIGHT, and, floodlit as it is, it will undoubtedly form a landmark which it is quite possible will stand out above the low lying fog so often covering the city. Space does not permit us to describe the many other interesting features contained in this building, for it is completely self-contained and therefore has its own kitchens, restaurants, automatic telephone exchange, a garage, boiler room, and in fact everything which can be imagined to make work in the building pleasant to the employees and profitable to the company.

Williamson's Annual Dinner

THE Williamson Manufacturing Co., Ltd., held their Annual Dinner and Dance on Friday, January 20, at Maison Lyons, Shaftesbury Avenue, and everyone had a very enjoyable evening. The directors of the company were the guests of the evening, and Mr. C. M. Williamson, C.B.E., F.R.P.S., the managing director, reported that in spite of the wide depression, the company's works had been fully occupied throughout the year. He was also able to report the conclusion of a large contract with a foreign Government for the supply of Eagle cameras, and that the number of "Eagle-minded" countries was now about thirty.

English Dope for Foreigners

TURKEY has recently been buying quite a considerable number of modern aircraft. Unfortunately, few of these have so far come from British factories; it is all the more gratifying therefore to learn that a fairly large contract for dope has been received from that country by Cellon, Ltd., of Kingston-on-Thames. This order has been secured in the face of keen competition from other European countries, and certainly goes to show that everything to do with the aircraft trade which emanates from Britain is looked upon as the best of its kind.

Rotax Equipment

THE complete range of electrical equipment for aircraft, which includes dynamos, switchboards, batteries, lamps, switches, etc., manufactured by Rotax, Ltd., Willesden Junction, N.W.10, is contained in their latest catalogue.

Technical Training

HANDLEY-PAGE, LTD., have just instituted a new scheme whereby their apprentices get the benefit of a whole day each week at the Northampton Polytechnic, in addition to the usual evening classes. The firm is paying the school fees, as well as the apprentices' wages.

THE ROYAL AIR FORCE

London Gazette, January 24, 1933.

General Duties Branch

The undermentioned flight cadets, having successfully passed through the R.A.F. College, Cranwell, are granted permanent commns. as Pilot Officers, with effect from and with seniority of December 17, 1932 :—J. C. Pope, R. G. Stone, P. R. Robinson, E. B. C. Davies, S. P. A. Patmore, M. K. D. Porter, W. R. Brotherhood, I. G. Mackay, D. S. Kite, P. S. Salter, D. H. Furze, R. J. Knights-Whittome, R. A. C. Barclay, J. F. H. Du Boulay, D. A. Pemberton, A. N. Bray, A. R. G. Bax, R. V. Rolph, L. Coulson, R. T. Smith, E. D. MacK. Nelson, M. Hastings, A. Golding, R. L. Bradford, A. G. Powell, M. J. O. Parish, P. J. P. Rogers, R. G. Coventry, P. de G. H. Seymour.

The undermentioned Sub-Lieuts., R.N., are granted temp. commns. as Flying Officer on attachment to R.A.F. (January 15) :—J. L. Hallewell, W. J. Lucas.

The undermentioned Pilot Officers are promoted to rank of Flying Officer (December 26, 1932) :—R. N. McKern, G. A. L. Manton, R. R. Murphy (January 13), D. W. Reid.

Flt.-Lt. J. M. Glaisher, D.F.C., is placed on half-pay list, Scale A, from January 8 to January 25 inclusive. Flt.-Lt. W. E. Knowlden is placed on retired list at his own request (January 3). Flt.-Lt. J. Noonan, D.S.M., is placed on the retired list on account of ill-health (January 16). F/O. W. M. Rankin is cashiered by sentence of General Court-Martial (January 20).

Accountant Branch

Sqd.-Ldr. C. C. J. Croydon is placed on retired list (January 25).

Medical Branch

The undermentioned Flying Officers are promoted to rank of Flight Lieut. (January 18) :—C. A. Rumball, M.R.C.S., L.R.C.P., L.D.S. ; D. C. MacGillchrist, M.B., Ch.B. The undermentioned are granted permanent commns. in ranks stated (January 25) :—Flt.-Lt. C. A. Rumball, M.R.C.S., L.R.C.P., L.D.S. ; F/O. O. M. Fraser, M.B., Ch.B., F/O. A. M. Weston, M.R.C.S., L.R.C.P.

Dental Branch

The undermentioned Flying Officers are promoted to rank of Flight Lieuts. : J. G. Stewart, L.D.S. (January 19) ; J. J. Lawson, L.D.S. (January 21).

Legal Branch

J. B. Walmsley, D.F.C., is granted a permanent commn. as Flight Lieut. on probation with effect from and with seniority of January 16, 1933.

ROYAL AIR FORCE RESERVE

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

N. J. Nock is granted a commn. in Class A as Flying Officer on resigning his commn. in Auxiliary Air Force (January 25). The undermentioned Flight Lieuts. are transferred from Class A to Class C :—F. A. Swoffer, M.B.E. (November 14, 1932) ; N. H. Jay (January 18).

F/O. C. J. Pooley is transferred from Class C to Class A (December 3, 1932). F/O. A. G. P. Way is transferred from Class AA (ii) to Class C (January 11) F/O. J. E. Preston relinquishes his commn. on completion of service (January 3).

SPECIAL RESERVE

General Duties Branch

P/O. L. M. Few is confirmed in rank (October 28). F/O. J. A. Hall resigns his commn. (December 16, 1932).

AUXILIARY AIR FORCE

General Duties Branch

No. 605 (County of Warwick) (Bomber) Squadron.—F/O. N. J. Nock resigns his commn. on appointment to a commn. in Reserve of Air Force Officers (January 25).

Accountant Branch

No. 601 (County of London) (Bomber) Squadron.—P/O. J. G. S. Donaldson resigns his commn. (October 21, 1932).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Air Commodore G. R. Bromet, D.S.O., O.B.E., to H.Q., R.A.F. Middle East, Cairo, 7.1.33, for duty as Senior Air Staff Officer vice Air Cdre. R. P. Ross, D.S.O., A.F.C.

Group Captain A. Corbett-Wilson to H.Q., Iraq Command, Hinaidi, 17.1.33, for duty as Sen. Equipment Staff Officer vice G/Capt. C. H. B. Blount, O.B.E., M.C.

Wing Commanders : E. B. Beauman to R.A.F. Base, Gosport, 14.1.33, for Administrative duties vice W/Cdr. L. M. Bailey, A.F.C. A. T. Williams, O.B.E. to Air Ministry, Dept. of Chief of the Air Staff (D.O.I.), 16.1.33, for Air Staff duties vice G/Capt. A. C. Maund, C.B.E., D.S.O.

Squadron Leaders : K. H. Rivsesdale-Elliot to School of Army Co-operation, Old Sarum, 12.1.33, for Flying duties with Training Squadron, vice S/Ldr. P. F. Fullard D.S.O., M.C., A.F.C. H. A. Smith, M.C., to Elec. & Wireless School, Cranwell, 16.1.33, for Flying duties vice S/Ldr. K. H. Riversdale-Elliot. R. S. Sorley, D.S.C., D.F.C., to Air Ministry, Dept. of Chief of the Air Staff (D.O.I.), 17.1.33, for Air Staff duties vice W/Cdr. R. H. M. S. Saundby M.C., D.F.C., A.F.C. R. S. Sugden, A. F. C. to Administrative Wing, Halton, 17.1.33, for Administrative duties vice W/Cdr. J. Leacroft, M.C.

Squadron Leaders : H. T. Lydford, A.F.C., to H.Q., Iraq Command, Hinaidi, 17.1.33, for Air Staff (Operations) duties vice W/Cdr. P. Huskinson, M.C. H. V. Rowley to H.Q., Iraq Command, Hinaidi, 17.1.33, for Air Staff (Operations) duties vice S/Ldr. M. B. Frew, D.S.O., M.C., A.F.C.

Flight Lieutenants : H. M. Groves to No. 3 Flying Training School, Grantham, 9.1.33. A. Jerrard, V.C., to No. 3 Flying Training School, Grantham, 13.1.33. E. G. H. Russell-Stracey to No. 1 (F) Sqdn., Tangmere, 12.1.33. J. V. Yonge to No. 23 (F) Sqdn., Biggin Hill, 13.1.33. S. L. Blunt to No. 23 (F) Sqdn., North Weald, 16.1.33. J. Oliver, A.F.C., to No. 5 Flying Training School, Sealand, 17.1.33.

Flying Officers : N. W. A. Cullum to No. 500 (County of Kent) (B) Sqdn., Manston, 17.1.33. G. F. W. Heycock to H.Q., Inland Area, Stanmore, 15.1.33. V. R. Moon to No. 503 (County of Lincoln) (B) Sqdn., Waddington, 17.1.33. L. Darvall, M.C., to H.Q., Iraq Command, Hinaidi, 17.1.33. J. H. Hargroves to R.A.F. Base, Singapore, 3.1.33. L. L. King, D.F.C., to No. 205 (F.B.) Sqdn., Singapore, 3.1.33. H. Little to H.Q., R.A.F. Middle East, Cairo, 17.1.33. K. C. McKenzie, M.B.E., to Station H.Q., Amman, 17.1.33. J. Marsden to No. 55 (B) Sqdn., Hinaidi, 17.1.33. H. M. G. Parker to No. 203 (F.B.) Sqdn., Basrah, 17.1.33. W. Wynter-Morgan, M.C., to H.Q., Iraq Command, 17.1.33. J. H. Powle to R.A.F. Base, Gosport, 11.1.33. R. A. F. Roberts to R.A.F. College, Cranwell, 12.1.33.

Flying Officers : The Hon. F. D. H. Lea-Smith to Air Armament School, Eastchurch, 13.1.33. A. W. M. Finny to No. 47 (B) Sqdn., Khartoum, 17.1.33. E. B. Grace to No. 4 Flying Training School, Abu Sueir, 17.1.33. L. T. G. Barber to No. 201 (F.B.) Sqdn., Calshot, 9.1.33. B. A. Blythe to R.A.F. Base, Calshot, 9.1.33. J. Cox to Station Flight, Duxford, 12.1.33. J. Y. Humphreys to No. 2 (A.C.) Sqdn., Manston, 1.1.33. G. R. Montgomery to No. (B) Sqdn., Worthy Down, 12.1.33.

Acting Pilot Officers : The undermentioned Acting Pilot Officers are Posted to R.A.F. Depot, Uxbridge, on appointment to Short Service Commns. :—F. E. H. Cooper, H. M. Cox, R. J. F. Craig, G. W. Golledge, W. M. Graham, N. W. D. Marwood-Elton, B. J. Paul, A. Ross, A. G. Strutt, H. C. S. Vetch, C. H. D. Wardrop, and C. F. C. Wright, on 6.1.33, F. D. Nugent on 9.1.33, and E. H. Wheelwright on 10.1.33.

Stores Branch

Wing Commander R. W. Thomas, O.B.E., to Supply and Transport Services, Iraq, 17.1.33, for Stores (Supply) duties vice W/Cdr. F. A. Baldwin.

Flying Officers : G. G. N. Marshall, M.B.E., to Aircraft Depot, Hinaidi, 17.1.33. V. H. B. Roth to Aircraft Depot, Hinaidi, 17.1.33.

Pilot Officers : The undermentioned Pilot Officers are Posted to H.Q., R.A.F., Cranwell, 6.1.33, on appointment to Permanent Commns. :—R. C. V. Ash, C. H. E. Lyster, E. J. Smith, D. Stephenson and D. F. Syder.

Accountant Branch

Flight Lieutenant R. W. L. Glenn to Station H.Q., Worthy Down, 14.1.33.

Flight Lieutenants : J. C. Brice to Station H.Q., Boscombe Down, 19.1.33. R. G. D. Thomas to No. 14 (B) Sqdn., Amman, Palestine, 17.1.33.

Flying Officer J. E. Ackers to No. 84 (B) Sqdn., Shaibah, Iraq, 17.1.33.

Medical Branch

Wing Commanders : K. Biggs, M.C., to No. 23 Group H.Q., Grantham, 16.1.33, for duty as Sen. Med. Officer vice W/Cdr. P. M. Keane. A. S. Glynn to H.Q., Wessex Bombing Area, Andover, 13.1.33, for duty as Principal Med. Officer.

Squadron Leader R. J. Aherne, M.C., to R.A.F. Training Base, Leuchars, 17.1.33, for duty as Medical Officer.

Flight Lieutenant R. E. Alderson to Princess Mary's R.A.F. Hospital, Halton, 13.1.33. P. B. L. Potter to R.A.F. Pathological Laboratory, Halton, 13.1.33.

Legal Branch

Flight Lieutenant J. B. Walmsley to Special Duty List, 16.1.33, for Legal duties in the Office of Judge Advocate General ; on appointment to a Permanent Commn.

Chaplains Branch

Rev. W. P. Hughes to R.A.F. Record Office, Ruislip, 18.1.33, for duty as Chaplain (Church of England).

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

Lieuts. (F/O., R.A.F.).—F. W. N. Bassett, reattached to R.A.F., and apptd. to *Victory*, for R.A.F. Base, Gosport, for course (January 26) ; and to *Victory*, for School of Naval Co-operation, Lee-on-Solent, and for 443 Flight (February 2) ; and R. E. Gunston, to *Victory*, for R.A.F. Base, Gosport, for B.T.S. (January 27) ; A. C. R. Duball, to *Victory*, for R.A.F. Base, Gosport, for B.T.S. (February 1).

H.M.S. "Glorious" and H.M.S. "Eagle"

H.M.S. *Glorious* returned to the Mediterranean, leaving England on January 25, 1933. No. 409 (F.F.) Flight, which has been earmarked for H.M.S. *Glorious*, embarked.

The Headquarters Flight, H.M.S. *Eagle*, will re-form with effect from February 1, 1933.

Royal Air Force. Air Aides-de-Camp to the King

The King has approved the appointments of Group Captain L. A. Pattinson, D.S.O., M.C., D.F.C., and Group Captain F. L. Robinson, D.S.O., M.C. D.F.C., as Air Aides-de-Camp to His Majesty in the vacancies created by the promotion to air rank of Group Captain F. K. Haskins, D.S.O., and Group Captain J. E. A. Baldwin, D.S.O., O.B.E., on January 1, 1933.

Protest against a Bombing Range.

The Sussex Sea Fisheries Committee are protesting vigorously against a proposal of the Air Ministry to establish a bombing and air gunnery range over an area three miles westward of Dungeness which includes the greater part of Rye Bay. It is asserted that the spot where the famous Rye Bay, plaice are caught is included in the area and that the fishing ground would be entirely ruined by the bombs.

Award to Master and Crew of Greek Steamer

The Air Council have awarded a piece of plate to Athanasios Costaropulos, Master of the Greek steamer *Nicos*, a binocular glass to Demetrius Nicoltsos, Chief Officer, and a sum of money to two members of the crew, in recognition of their services in effecting the rescue of six members of the crew of the Royal Air Force flying boat No. N.240, which sank in the North Channel on the 13th July, 1932.

The Board of Trade have been requested by the Air Ministry to present these awards on behalf of the Air Council.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

(*Editor of "Stamp Collecting"*)

Record Price for Air Stamp Error

It is significant that at a time of unparalleled financial depression in America a copy of the rarest air mail stamp should have been sold in New York for a record sum. At the sale by auction of the celebrated stamp collection formed by ex-Senator Frelinghuysen one of the hundred specimens extant of the misprinted 24 cents air post stamp of the United States series 1918 was run up to the equivalent in dollars of £550—which is approximately a hundred pounds more than the previous auction room record for this variety. Rumour has it that the buyer was a wealthy London lady who already owns one of the most complete accumulations of air mail stamps and covers in the world.

Although an entire sheet of 100 copies originally existed not more than about sixty or seventy of these have come on to the market in the last fifteen years, and a number of these have been what are known to collectors as "straight-edges," *i.e.*, perforated on three sides only and therefore to be classed as second-rate examples. The balance still reposes in the collection of Col. H. Green, the American railroad magnate by whom the full sheet was acquired as soon as the error was first discovered.

In the current edition of Gibbon's stamp catalogue it figures at £700, and there is little doubt that in due course the growing demand by aero-philatelists all over the world will force the auction price up to something approaching that figure, notwithstanding that up to a few years ago copies were going begging at £150! Which only goes to show how the market values of the rarer items in air post stamps have risen with the popular development of the cult.

M.P.'s Air Stamps

A prominent collector of air post material is Mr. Lindsay Everard, M.P., whose interest in everything concerned with aviation is well known. Two years ago he entertained delegates to the Philatelic Congress of Great Britain at his private aerodrome, at Ratcliffe, near Leicester, and more recently his fellow members of the Leicester Philatelic Society were privileged to inspect a number of his choicest pieces at one of their regular meetings. A melancholy note was cast over the proceedings, however, by the fact that Mr. Everard was prevented from displaying his collection personally owing to the untimely death from influenza of the late Miss Winifred Spooner, the famous airwoman, who was in charge of his aircraft.

Speculative Air Stamps Destroyed

Air stamp collectors the world over will be gratified to learn that the attempt made to exploit them through the so-called Aerial World Tour stamp prepared by an American syndicate, and only repudiated by the Newfoundland Government at the eleventh hour, has ended in a complete fiasco. After ineffectual efforts to unload them upon a sceptical public it is reported that the entire stock of printed labels, together with the original dies and plates, has been consigned to the flames and the stamp that failed is no more.

Commentative Air Stamps

The growing tendency on the part of certain countries to create unnecessary issue of air mail stamps of a purely commemorative character is strongly to be deprecated. Air mail stamps are in themselves a subsidiary issue made for a specific purpose, and unless they are required for and strictly confined to that object, there can be no real excuse for their existence.

Nicaragua has been a serious offender in this line during the past few months, when two series of particular postage stamps issued to celebrate the inauguration of new lines of railway in the Republic have been extended to ridiculous lengths by the inclusion of quite superlative air mail denominations. The same remarks apply to recent emissions from Salvador, Latvia, Lithuania, etc., and now we are threatened with a limited edition of six commemorative air post stamps from Peru in honour of the centenary of Ricardo Palma. If collectors would only unite in refusing to admit to their albums stamps created for other than legitimate air mail requirements, there would soon be an end to this ramp which at the moment threatens to become all too general.

First U.K. Aerial Post, 1911

Correspondents are constantly inquiring as to the market value of postcards and letters carried on these experimental flights between London and Windsor, at the time of the King's Coronation. When it is remembered that upwards of 135,000 missives were transmitted by air within the ten days that the service functioned, it must be obvious that few of them can be valuable. About 7s. 6d. to half-a-sovereign is the average value of the brown or olive-green cards dated September 9, 1911, the opening day, when 103,000 in all were mailed. The best of the batch are the privilege cards and envelopes printed in royal purple, worth on an average from £3 to £4 apiece, if in good state of preservation. Next come the envelopes printed in scarlet or emerald green, valued at from 30s. to £2 each, according to dates of posting. Finally, cards and covers flown from Windsor to London instead of *vice-versa* all stand at a premium.

In the past too little attention has been paid by aero-philatelists to these and other souvenirs of pioneer air post flights in Great Britain, but to-day there is a growing interest in this phase of air post collecting, and some really notable collections are in process of formation by far-sighted enthusiasts.

PUBLICATIONS RECEIVED

Some Upper-Air Observations Over Lower Egypt. By S. P. Peters, B.Sc. M.O. 331f. Geophysical Memoirs No. 56. London: H.M. Stationery Office, W.C.2. Price 3s. net.

Rubber Latex. By Henry P. Stevens, M.A. (Oxon.), and W. H. Stevens, A.R.C.Sc. The Rubber Growers' Association, Inc., 2, 3, and 4, Idol Lane, Eastcheap, London, E.C.3.

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